

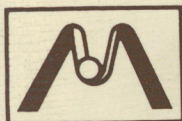
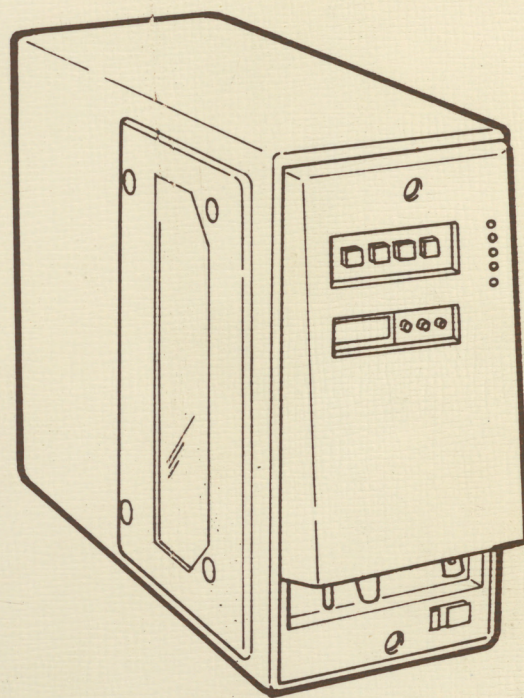
Panasonic®

RECAM™

Portable VTR

AU-100A

Operating Instructions & Service Manual



M-VISION™

Notice

Thank you for your purchasing of this Panasonic B-100/AU-100 and Solicit your continued patronage on our product.

For your guidance, we now wish to advise you that the following functional features are newly added on for better improvement of total functional features of our B-100/AU-100:

1) Playback is possible.

Push down FF button while Stop Button is kept on being pressed down. Then this unit performs playback operation.

The playback picture will be in black/white, which can be monitored by means of Camera Viewfinder.

2) Reviewing of function of recorded picture.

When the Return Video Button at camera side is pressed down in the "Stand-by" mode of recording, the tape will be rewound for about 5 seconds, starting from the very point, playback in B/W mode is carried out, and then after it will be changed into Stand-by mode. The playback picture will be in black/white, which can be monitored by means of the camera viewfinder.

3) Interface connector

The following pins are now added on further.

pin	Description
25	RETURN VIDEO
3	RETURN VIDEO GND
58	PLAY COMMAND

4) Operation Buttons

The following table shows the function button and mode correlation. "0" indicates that the AU-100 is transferred to the desired mode but "X" indicates that this may not happen.

Desired mode \ Current mode	EJECT	REW	STOP	FF	REC ON	REC OFF	MANUAL EJECT	PLAY-BACK (Note 3)	REC REVIEW (Note 4)
Cassette out		X	X	X	X	X	O	X	X
Tape rewind	X		O	O	O (Note 1)	X	O	X	X
Stop	O	O		O	O (Note 1)		O	O	X
Tape fast forward	X	O	O		X	X	O	O	X
Recording	X	X	X	X		O	O	X	X
Auto back-space	X	X	X	X	O (Note 2)	O	O	X	X
Standby	X	X	O	X	O		O	X	O
Playback	X	X	O	X	X	X	O		X
Rec review	X	X	X	X	O (Note 5)		O	X	
Tape loading	X	X	X	X	O	O	O	X	X
Tape unloading	O	X	X	X	O		O	X	X

Note 1: The unit will not be set to the REC mode even if the VTR start/stop switch is pushed when the tape has stopped upon detection of the tape end and the modes switched to rewind from the tape end. (Only from the tape end in Rec On mode.)

Note 2: The REC mode is established after the auto back space operation.

Note 3: Push the FF Button by holding down the STOP Button. The playback mode is ensured.

Note 4: Push the Return Video Button on camera side. Then the REC REVIEW mode is ensured.

Note 5: The REC mode is established after the Rec Review operation.

Printed in Japan

VQC0566

F0883M0-80

BEFORE READING

BEFORE YOU START TO READ THE PRESENT SERVICE MANUAL, BE AWARE OF THE FOLLOWING.

MANUAL CHANGE INFORMATION

This refers to our literal information on the change of the contents of the AU-100 Service Manual.

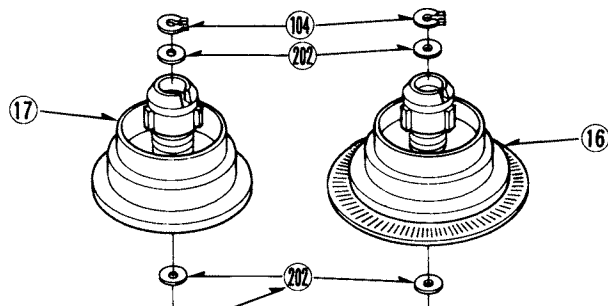
In pursuit of further improvement in the mechanism of the AU-100, the view finder playback function has been added to it recently, resulting in the debut of "AU-100A" as a new version. As a result, the relevant Service Manuals have been gradually modified by replacing the contents in some pages. However, due to the printing convenience for now, modified contents have not been fully available for distribution to our distributors abroad in style of the printed literatures. In order to have you kindly understand the modification already effective, please be aware of the following notice of change. Thank you.

AU-100A

EXPLODED VIEWS

Reel/Motro Assembly (Page 5-2)

Changing the Illustration



Change the Ref. No. From 202 to 205

Change to;

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
202	XWGV3D6G	Polyslider	5	
205	XWGV3D6G	Polyslider 0.5 mm	2	
205	XWGV3F6G	Polyslider 1.0 mm	2	
205	XWGV3Z6G	Polyslider 0.13mm	2	

Note: The polysliders whose reference numbers 205, are used for height adjustment of the reel tables. Place orders for the most suitable polyslider.

Load Unit Assembly (Page 5-3)

Change of the Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
2	KCX30BT6A	Capstan Motor	1	
3	VEM0135	Loading Motor	1	
14	VXL1048	Draw-Out Arm Unit	1	

Lock Base Assembly (Page 5-4)

Change to;

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
8	VXL0966	Main Lever Unit	1	
9	VMM0125	Sub-Rod	1	

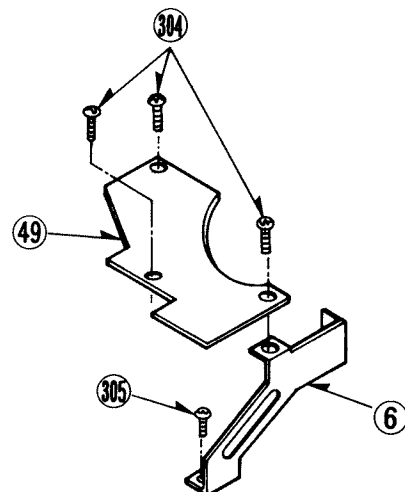
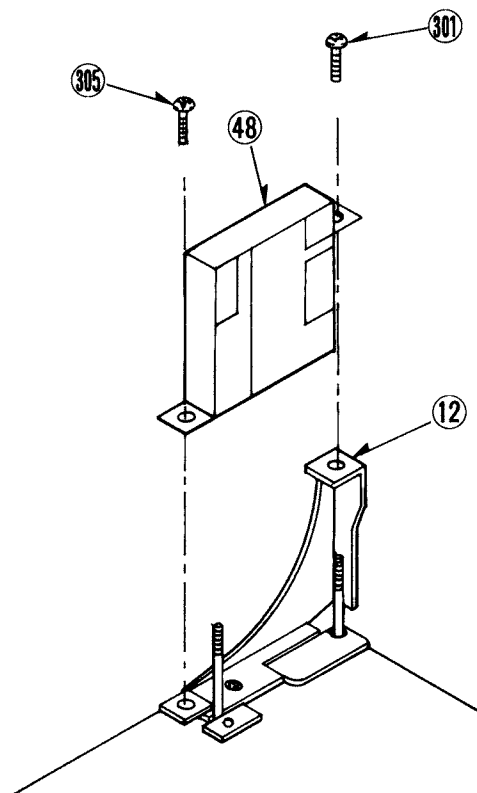
Chassis Unit Assembly (Page 5-5)

Change to;

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
12	VMP0301	Coupling Reinf. Plate (L)	1	
17	VXA1812	Special Belt (L) Unit	1	
18	VXA1811	Special Belt (R) Unit	1	
48	VEP05050A	Head Amp C.B.A.	1	
49	VEP03190A	Y Playback C.B.A.	1	

Change of illustration

Page 5-5



Change to;

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
302		VHD0042	Screw	4	

2. INTERCONNECTION SECTION

Change to;

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
SW605		VSS0043	Mode Select SW	1	
C602		ECKF1H222KB	Ceramic 50V 2200P	1	

Page 5-11

Delete to;

Ref. No.		Part No.	Part Name & Description	Pcs / Set	Remarks
		VJB00833	Hour Meter C.B.	1	

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Operating Instructions	1-1 ~ up
Technical Descriptions	2-1 ~ up
Electrical Adjustment	3-1 ~ up
Mechanical Adjustment	4-1 ~ up
Exploded Views & Mechanical Parts List	5-1 ~ up
Modules	
Video Processor	6-1 ~ up
Servo/System Control	7-1 ~ up
Audio Processor	8-1 ~ up
Time Code Generator	9-1 ~ up

How to Use This Service Manual

In order to conform to standard practice used in Broadcasting, this Service Manual is organized differently from other Panasonic Service Manuals. In addition to the Table of Contents, on the next page the user is urged to do the following:

1) To Locate Electrical Parts—

- a) Locate the module using the diagram on the last page of Electrical Adjustment Section.
- b) Find the particular module in the Upper or Lower Module section—it contains the Parts List, Schematic Diagrams, and PCB Layout. Locate the Part.

2) To Locate Mechanical Parts—

- a) Locate the position of parts in the Exploded View sections.
- b) Using the numbered key, find the part number in same section.

3) To Locate Other Parts—

- a) Locate the part on the Wiring Diagrams at the end of Exploded View section.
- b) Look up the part number in the Parts List in front of this section.

4) To Locate Service Equipment List, please refer to beginning of Electrical Adjustment section.

5) To Locate Tools and Jigs, refer to beginning of Mechanical Adjustment section.

6) For Disassembly instructions, refer to Mechanical Adjustment section.

RECAMTM

Operating Instructions

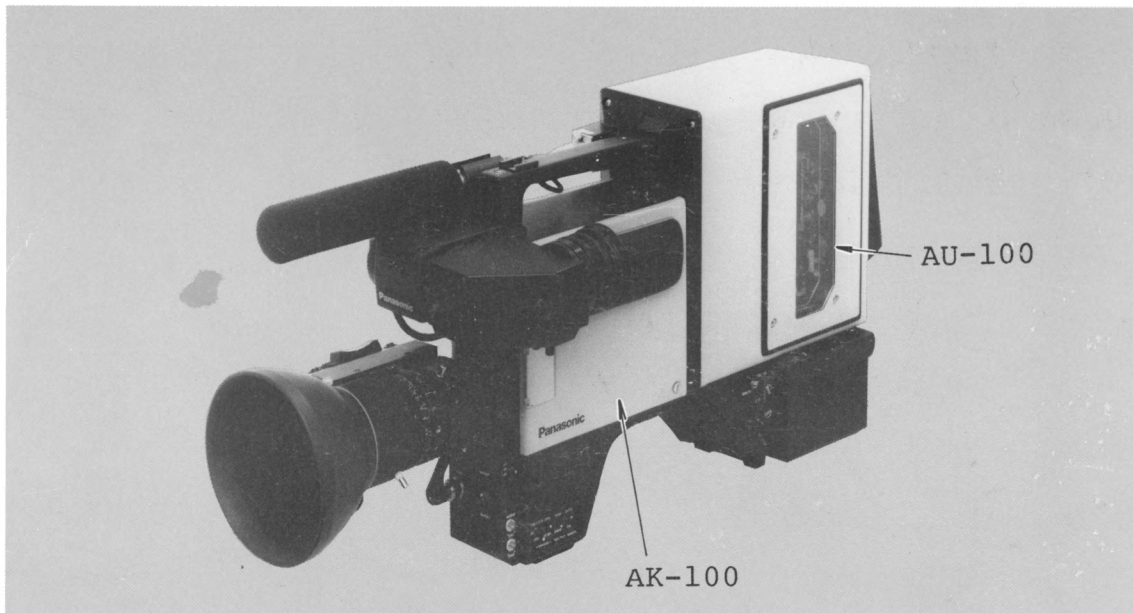


M-VISION

IN-CAMERA VTR

B-100

(consist of AK-100 and AU-100)



Panasonic^R

Before attempting to connect, operate or adjust this product, please read these instructions completely.

VQT0875-1

Thank you for purchasing this electronic news gathering unit from Panasonic.

This Instruction Manual deals first with the AK-100 color camera and then with the AU-100 portable VTR. A description of the portable VTR's operations is given in its own instruction manual. For further details on the AK-100 color video camera, refer to the instruction manual of the AK-100 camera.

WARNING - THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

WARNING: TO PREVENT FIRE OR SHOCK HAZARD,
DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

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1. OVERVIEW

The M-Vision B-100 system combines a color video camera and a video tape recorder for recording programs in ENG and EFP environment. Featuring generator mobility and operational ease, this integrated Camera/VTR system targeted for commercial and broadcasting applications incorporates the new M recording format which exceed the specifications of the conventional U-Vision (3/4-inch) format and which produces a high picture quality, approaching that of a 1-inch VTR. The system is composed of a 3-tube camera unit, lens, record-only VTR and batteries. All the shooting and recording functions have been integrated into a single unit.

By reducing the size and weight of various units, the total weight is a light 22 lbs (10 kgs). By distributing the weight optimally, the system is characterized by a superior balance.

The AU-100 is a 4-head helical scan-type VTR based on the new M format recording system using VHS cassette tapes. The component recording system, where the luminance signal is recorded on the Y track and the chrominance signal, consisting of I/Q FM multiplexed signal, is recorded onto the C track, yields high quality playback pictures with a luminance signal bandwidth of 3.0 MHz and a chrominance signal bandwidth of 1.0 MHz, which could not be realized using color-under conventional system incorporated in present cassette-format VTRs.

In addition to the above the B-100 system is able to perform automatic assembly edits based on auto back space mechanism, 2-track audio has the capability for recording and has a built-in time code generator.

The dichroic prism camera unit is engineered to produce high-quality pictures. It includes auto black and white balance circuits and a 2H-line enhancer circuit. There are two standard models; the AK-100P with the 2/3-inch diode gun Plumbicon* pickup tubes and the AK-100S with the 2/3-inch Saticon** pickup tubes.

Optional lens choice includes bayonet-mounted 10x, 12x, 13x, or 14x zoom lenses.

The camera and VTR units can be disengaged by a single action for easy maintenance.

* "Plumbicon" is a registered trademark of N.V.
Philips.

** "Saticon" is a registered trademark of Hitachi, Ltd.

2. FEATURES .

2-1. VTR SECTION

1. Broadcast-type VTR with built-in camera

This is a portable VTR designed for outdoor shooting and developed for broadcast purposes. For enhanced mobility, the VTR and video camera have been integrated into a single unit without interconnecting cables.

2. High level of picture quality

This portable VTR employs the 1/2-inch M format recording method which yields a high picture quality approaching that of 1-inch VTR.

3. Y/I/Q recording system

The new M-format system is featured in which the video signal, separated into the Y signal and the I/Q signals, is recorded by separate heads.

4. Tape speed

Due to the requirement that the highest possible picture quality be obtained, the tape speed is set at about 8 ips (20 cm) per second thus resulting in a maximum recording time of 20 minutes when the NV-T120 HG tape is used.

5. Light weight

Design targets focused on making the weight as low as possible in order to open up more shooting possibilities and applications and, as a result, the total weight of the camera, VTR, and battery is about 22 lbs (10 kgs.)

6. Simple operation

Only four function buttons are provided: Fast Forward, Rewind, Stop and Cassette Eject. All are feather-touch direct operation buttons. Recording is enabled or stopped by operating a switch on the video camera.

7. Auto backspace mechanism

When shooting is momentarily stopped, by pushing the start/stop switch on the video camera, the tape is automatically rewound for about 30 frames (approx. 1.0 sec.) in preparation for the next shooting sequence.

The VTR goes into record mode about 27 frames from this point when shooting is resumed. This provides smooth automatic continuity between scenes so that the pictures flow naturally in the end product.

8. Built-in SMPTE time code generator

The unit incorporates a built-in SMPTE time code generator which allows the absolute position of the tape to be located.

The time code is recorded on the specially assigned track at the same time as the video signals are captured on tape.

9. Two audio channels (600 ohms, balanced)

Two separate high-quality audio channels are available for recording sounds.

10. Alarm functions

The alarm sensing circuits are activated when the cylinder servo or capstan servo is unlocked, when there is tape slack, and when shutdown occurs because of dew. The indicators in the camera viewfinder light up to indicate the cause of malfunction.

A LED display also blinks to warn when there is about 1 minute of tape left and when the battery charge is low.

2-2. COLOR CAMERA SECTION

1. Optical system

- (a) A medium index prism is employed to assure good weight distribution and low center of gravity.
- (b) 2/3-inch diode gun Plumbicon (AK-100P) or 2/3-inch Saticon (AK-100S) pickup tubes are featured.
- (c) A bias light has been incorporated into the optical system to minimize lag.

2. High sensitivity

Normal lens iris for full video output is f4.0 for the AK-100P and at f3.5 for the AK-100S when a 90% reflectance chart is illuminated by 1450 lux.

When the +18dB sensitivity switch is activated, the minimum illumination in case of AK-100P is 29 lux/f1.6 and 38 lux/f1.6 is case of AK-100S. The gain boost (+9dB, +18dB) switches are located on the front of the camera.

3. High resolution and signal-to-noise ratio

These ratings are 600 lines and 59dB for the AK-100P and 550 lines and 58dB for the AK-100S under conditions of gamma "off" and detail "off" in both cases.

4. Y/I/Q encoder

This camera unit employs a Y/I/Q encoder in addition to normal NTSC encoder. The Y signal and baseband I and Q signals are formatted for M-format recording.

5. Black stretch circuit

The black stretch circuit increases the contrast in the dark areas. It is especially effective in improving black smudging in backlit areas or shadow areas.

6. Matrix circuit

This circuit improves color reproduction and facilitates camera matching. Color vector positions may be varied without affecting in white balance.

7. Corner registration compensator circuit

This circuit compensates for registration errors in the corners of the screen caused by mechanical distortion in the coil assembly and/or pickup tubes.

8. Automatic circuitry

(a) Automatic black balance control circuit has been included to correct deviations in the black balance caused by the fluctuations of ambient temperature, etc.

(b) Automatic white balance

The automatic white balance control circuit is featured in order to correct the deviations in the white balance caused by the differences in the color temperatures of various illuminants. The auto

white/black balance information in the form of 8-bit codes is maintained even after the power has been turned off. A small nickel-cadmium battery powers this memory only and is recharged during normal shooting.

(c) Automatic iris control circuit

This circuit is used to obtain the correct exposure at all times.

(d) Automatic lens closing circuit

This circuit is provided to prevent light from entering the pickup tubes when the power is switched off or during stand-by condition.

9. Sync signal

The unit's signal complies with the EIA RS-170A standard. The horizontal and vertical blanking widths can be adjusted (H: 10.0 - 11.5 μ s; V: 18 - 21H).

10. Test signals

EIA color bar, focus wobbling and sawtooth wave generator circuits are built into the unit.

11. Built-in optical filters

Two optical filters are employed in the Plumbicon model. See Table 1 for details.

ND filter	100%	25%	6.5%	Closed
CC filter	3200°K	4700°K	5600°K	7500°K

Only 1 filter is used in Saticon model: Closed, 3200°K, 4700°K, 5600°K + 25% ND positions.

12. Viewfinder

The 1.5-inch viewfinder is a high resolution type. The excessive video level (serrated image), audio 1 level (horizontal white bar), audio 2 level or power supply voltage (horizontal white bar) are indicated in the viewfinder.

Tally, VTR warning, power supply voltage warning, and tape consumption are indicated by means of LEDs.

3. SPECIFICATIONS

3-1. VTR SECTION

GENERAL

Power requirement: 12V DC

Power consumption: 12W

Recording system: 4 rotary heads, helical scanning, separate
track system

Tape transport mechanism: VHS M-format (1/2" tape)

Tape speed: 8 ips (204.5mm/s)

Tape: NT-T120 HG tape

Recording time: 20 minutes (NV-T120 HG tape)

Fast forward time: Less than 5 minutes (NV-T120 HG tape)

Rewind time: Less than 5 minutes (NV-T120 HG tape)

Weight: Approx. 9.02 lbs. (4.1kg)

Dimensions: 4-3/4"(W) x 9-3/8"(H) x 10"(D)
120(W) x 237(H) x 253(D) mm

CONNECTORS

Interface: 62 pin

VIDEO OUTPUT: BNC, female, X1

MIC (CH1): XLR, female, X1

AUDIO INPUT (CH2): XLR, female, X1

AUDIO MONITOR: M2, female, X1

EXTERNAL TIME CODE INPUT: LEMO, female, X1

VIDEO

Television system: NTSC system, 525 lines, 60 fields

Modulation system: Frequency modulation for luminance signal
Frequency modulation multiplexing
for chrominance signal (I/Q)

Horizontal resolution: Over 350 lines (monochrome, color)

Bandwidth : 3.0MHz -1dB for luminance
1.0MHz -1dB for chrominance

Signal-to-noise ratio : Better than 47dB (unweighted)
for luminance
Better than 48dB (unweighted)
for chrominance (AM and FM
component)

Differential gain: Less than 5%
Differential phase: Less than 5°
K-factor (2T pulse): Less than 2%

Inputs

Y: 1.0Vp-p (75% color bar), 75 ohms unbalanced
I: 0.714Vp-p, 75 ohms unbalanced
Q: 0.714Vp-p, 75 ohms unbalanced

Outputs: NTSC composite video, 1.0Vp-p, 75 ohms

AUDIO

Frequency response: 50—15,000Hz ±3dB
Signal-to-noise ratio: Better than 50dB
Crosstalk: Better than 40dB

Inputs

MIC: -60dBm, 600 ohms balanced } switch selectable
LINE: +4dBm, 600 ohms balanced }

Output: EARPHONE, -20dB ~ -32dB (variable), 8 ohms unbalanced

EXTERNAL TIME CODE

Input: 2.5Vp-p, 600 ohms unbalanced

ENVIRONMENTAL

Ambient temperature

Operating: 32°F - 104°F (68°F reference temperature)

Storage: -4°F - 140°F

Ambient humidity: 20% - 85% (50% reference humidity)

3-2. COLOR CAMERA SECTION

Power requirements: 10.5 - 17V DC

1.25A S-M Saticon

1.45A LOC diode gun Plumbicon

(Including 1.5-inch viewfinder)

System: NTSC 525 lines, 60 fields, 30 frames

Conforming to EIA RS-170A standard

Optical system: 3-tube, f1.4 medium index dichroic prism

Bias light, IR cut filter

Quartz filter provided in Plumbicon model

Pickup tube: 2/3-inch Plumbicon or Saticon

Signal-to-noise ratio: 59dB type for LOC diode gun Plumbicon
58dB type for other tubes
(With gamma "off," aperture correction
"off" and gain at 0dB)

Sensitivity: f4.0 for Plumbicon
f3.5 for Saticon
when 90% reflectance white is illuminated under
a 3200°K light source using 1450 lux of
illumination

Sensitivity boost: +9dB, +18dB

Resolution: 600 lines with LOC diode gun Plumbicon
550 lines with Saticon

Registration

Zone 1 (inside a circle equivalent to 80% of screen height):
Less than 0.1%

Zone 2 (inside a circle equivalent to 100% of screen height):
Less than 0.2%

Zone 3 (other areas): Less than 0.5%

Geometric distortion: Less than 2% across entire screen
(excluding lens distortion)

Gamma circuit: 0.4 - 0.55 variable
or 1 (gamma switches OFF)

Contour compensation: 2H type for vertical
Comb type for horizontal

Encoder: Y/I/Q

Blanking: H 10.7µs (10.0 - 11.5µs variable)
V 19.5H (18 - 21H variable)

Test signals: Split field EIA standard color bar
with camera number identifier
Focus wobbling, sawtooth waveform
generator

Video outputs

Monitor output: BNC X1

NTSC composite, Y/I/Q: Connectors for VTR hook-up

Mic input: -60dBm, balanced 600 ohms, XLR-3 connector

Audio output: -32dBV (25m VRMS), connector for VTR hook-up

Optical filters

AK-100S (Saticon)		AK-100P (Plumbicon)			
CC & ND		CC		ND	
0	CLOSED	A	3200°K	1	100%
1	3200°K	B	4700°K	2	25%
2	4700°K	C	5600°K	3	6.5%
3	5600°K +25% ND	D	7500°K	0	CLOSED

Lens: Bayonet mount

Temperature: -4°F - 122°F (Plumbicon)

-4°F - 113°F (Saticon)

(When using AU-100 32°F - 104°F)

Dimensions: 3-5/8"(W) x 10-3/8"(H) x 7-3/8"(D)

90(W) x 261(H) x 186(D) mm

Weight: Approx. 8.36 lbs.(3.8kg) for S-M Saticon

Approx. 8.8 lbs.(4.0kg) for Plumbicon

1.5-inch viewfinder section

Power requirements: 10.5 - 17.0V DC

CRT: 40LB4 (1.5-inch, high-resolution type)

Switches and controls

High peaking: ON/OFF

Talent tally: ON/OFF

Level indicator: ON/OFF

Brightness control

Contrast control

Indicators

Talent tally (outside viewfinder)

Tally (inside viewfinder)

VTR warning

Low voltage warning

Tape consumption

Dimensions: 7-1/8"(W) x 2-7/8"(H) x 4-7/8"(D) (including eye-piece)

178(W) x 70(H) x 121(D) mm

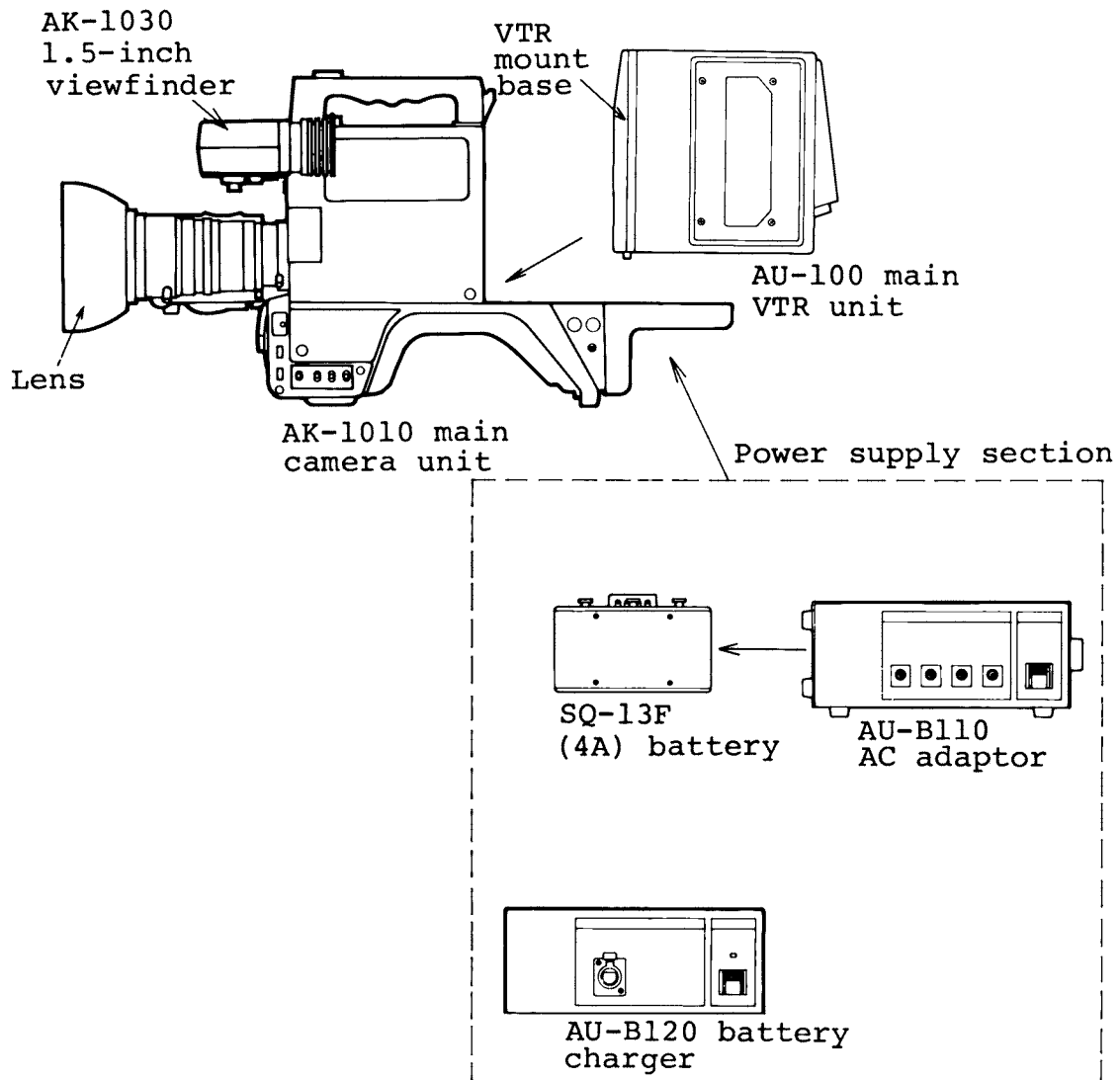
Weight: Approx. 1.1 lbs.(0.5kg)

Weight and dimensions shown are approximate.

Specifications are subject to change without notice.

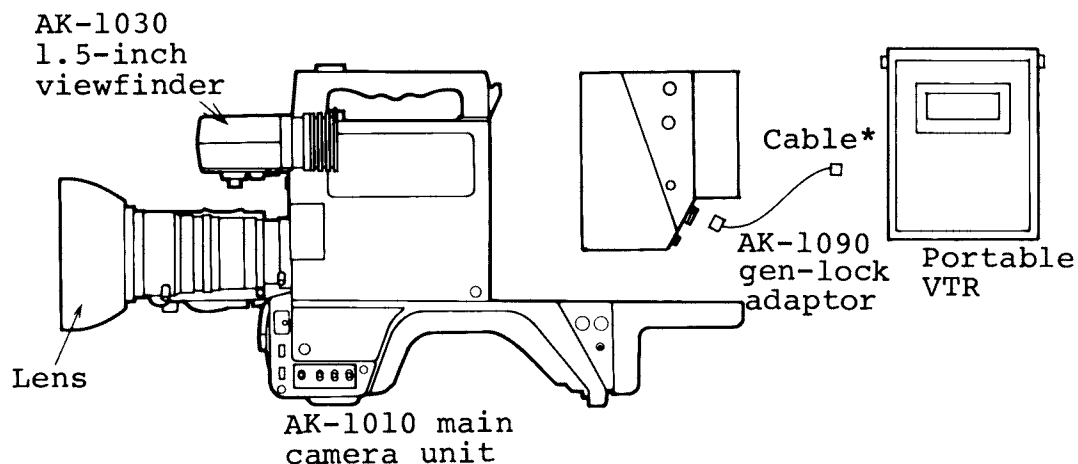
4. SYSTEM CONFIGURATION

4-1. AU-100 and AK-100 CAMERA SYSTEM



- With a full charge the SQ-13F will last for about 100 minutes of continuous recording.
- The AU-B120 battery charger is designed to recharge the SQ-13F battery. The charging time depends on the environmental conditions although at 68°F charging takes about 2 hours for the SQ-13F.

4-2. AK-100 COLOR CAMERA AND PORTABLE VTR (other than AU-100)
CONNECTION SYSTEM
(Using AK-1090 gen-lock adaptor)



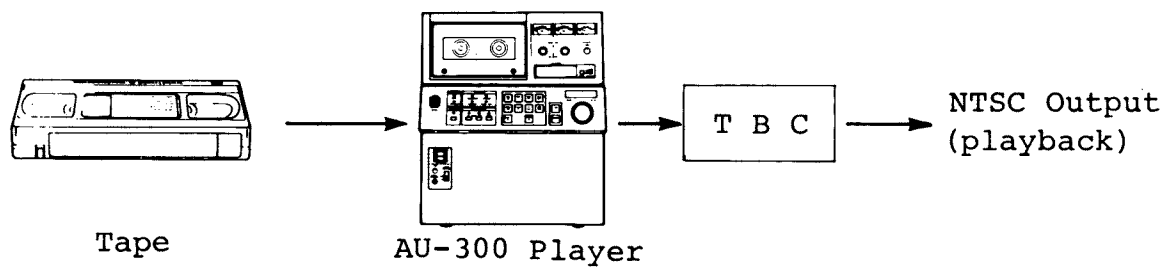
- The AK-1090 gen-lock adaptor and portable VTR are connected by the camera cable.

Cable*;

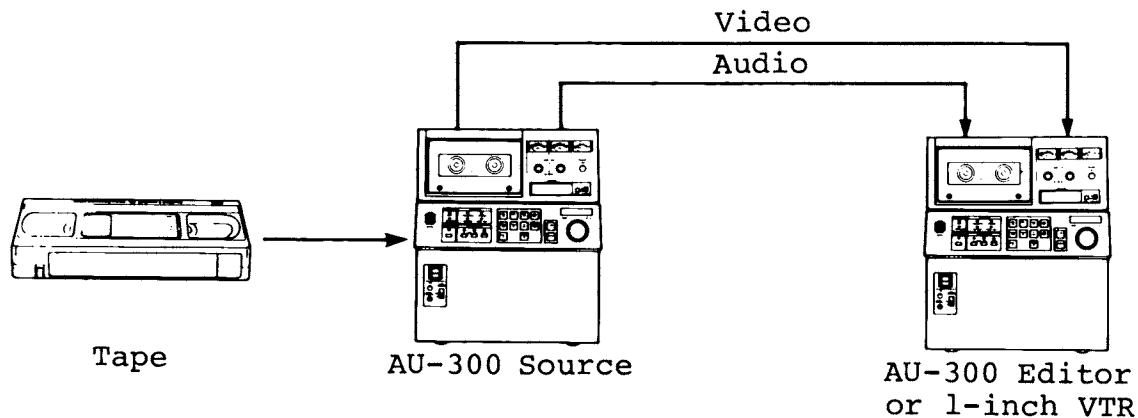
- 1) 26P ~ 26P; YGK1090XK02
(When connecting with portable VTR 26P camera connector)
- 2) 26P ~ 10P; YGK1090XK03
(When connecting with portable VTR 10P camera connector, for instance NV-9400)
- 3) 26P ~ 14P; YGK1090XK04
(When connecting with portable VTR 14P camera connector)

4-3. EDITING SYSTEM FOR PRE-RECORDED TAPES

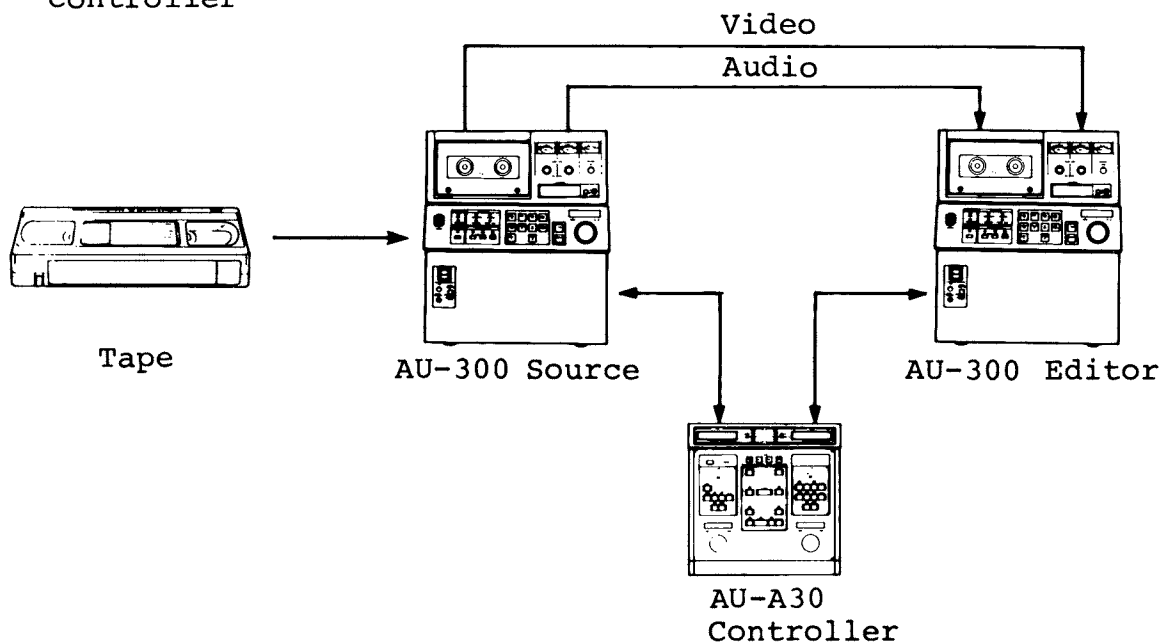
1. When playing back a tape recorded on the AU-100



2. When manually dubbing a tape recorded on the AU-100



3. When editing a tape recorded on the AU-100 with the AU-A30 controller



5. CONFIGURATION

5-1. AU-100 STANDARD CONFIGURATION

1. Main VTR unit: AU-100
2. Standard accessories
 - Extension cable: VFK0219
 - Rain cover: VFB0040

5-3. OPTIONAL ACCESSORIES

1. Main color camera unit: AK-1010
2. 1.5-inch viewfinder: AK-1030
3. Standard accessories
 - VTR mount base: YGK1010XK02
 - Extension printed circuit board: YGK1010XK05
 - Spare fuse (5A): YGF7142 (2 pcs.)
 - Tripod adaptor: YGK1010XK13
 - Shotgun microphone: WM-667

5.3 OPTIONAL ACCESSORIES

Gen-lock adaptor: AK-1090
Camera remote control unit: AK-1020
Remote operation panel: YGK1020XK01
Battery (4A): SQ-13F
AC adaptor: AU-B110
Battery charger: AU-B120
LEMO type connector: VJP1268 (for Time Code)
Cassette tapes

- NV-T120 HG (20-minute recording)
- NV-T60 HG (10-minute recording)
- NV-T30 HG (5-minute recording)

6. PRECAUTIONS FOR USE

(1) Do not point the camera at the sun.

Picture sticking may result when the camera is used to shoot an extremely bright object such as the sun for a prolonged period of time. With the Saticon there is a possibility that sticking will result even after the camera's power is turned off.

Consequently, the filter should be set to the "close" position first and then the camera's power should be turned off.

(2) Ambient temperature

This camera is designed to work over a temperature range of 32°F to 104°F. If it is used at higher temperatures or left exposed to high temperatures, permanent scars may appear on the screen which you may not be able to remove.

When using the camera below 32°F, the operator should provide protection from the cold. Otherwise the camera will not be able to display its inherent performance.

Under no circumstances should the camera be left inside a passenger car during the summer season.

(3) Rain, humidity, dust

Refrain from using the camera in rain or at high levels of humidity. Dew will form inside the unit which may result in malfunctions.

If the camera is used in a dusty environment, the dust may penetrate and impair the performance of the optical system.

[4] Handling

Do not drop the camera or subject it to strong shocks since this may result in malfunction. Do not insert objects into the unit with the cassette cover raised.

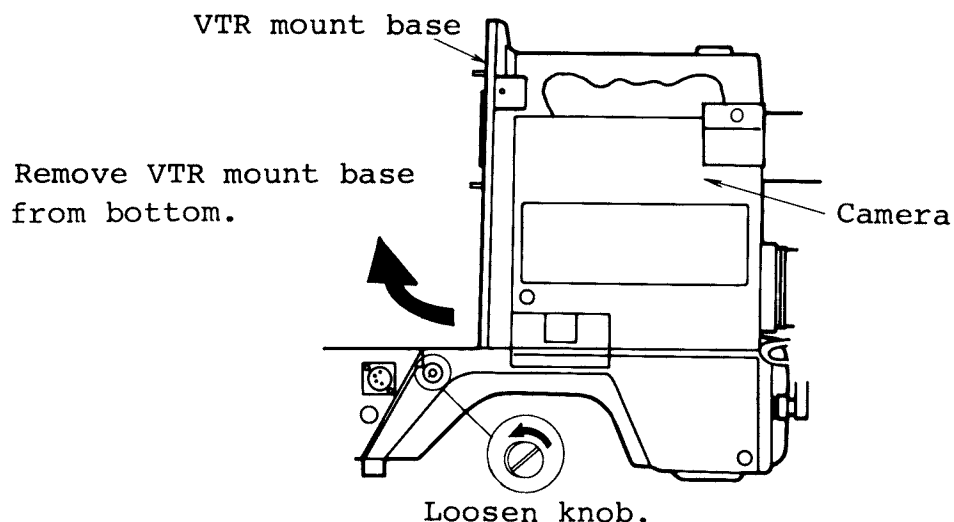
[5] Strong electrical and magnetic fields

Extremely strong electrical and magnetic fields can cause interference with the picture and/or sound.

7. ASSEMBLING THE CAMERA/VTR COMBINATION

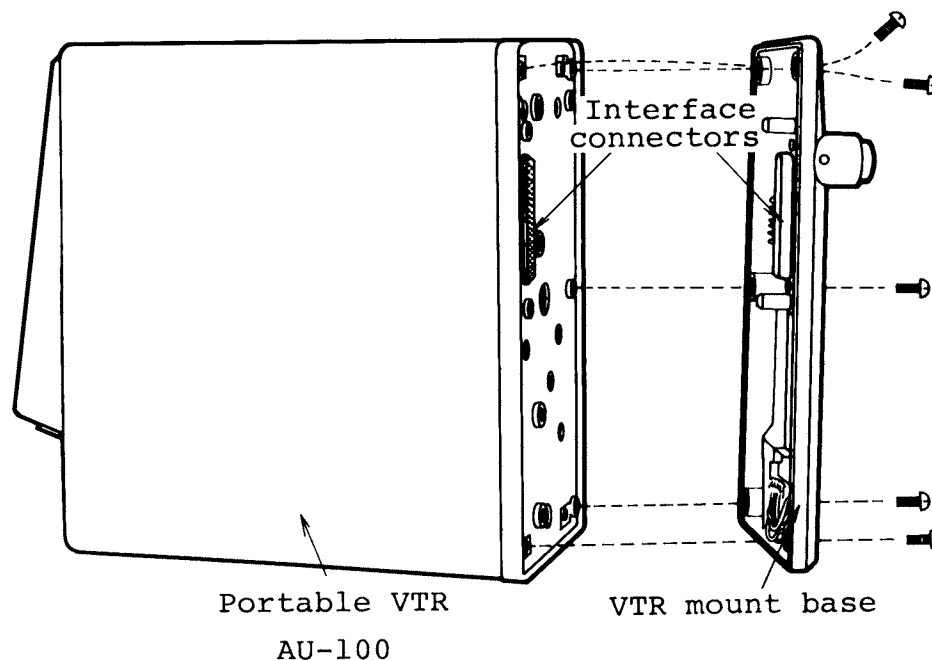
7-1. Removal of the VTR mount base attached to the AK-100.

- (1) Loosen the camera/VTR anchor knob.
- (2) Remove the VTR mount base from the camera by tilting the bottom portion in the direction shown by the arrow.



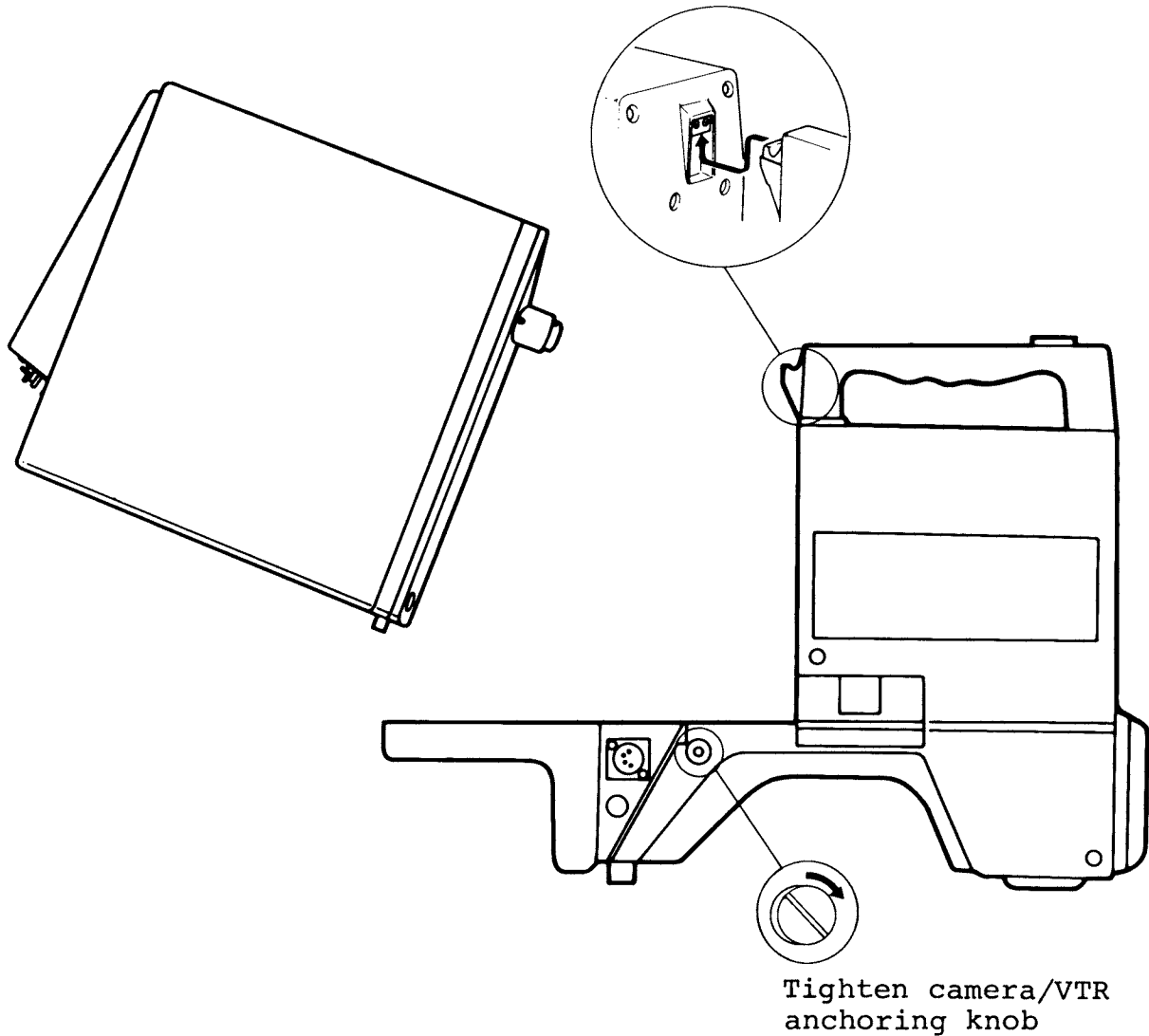
7-2. Attaching the VTR mount base to the VTR (AU-100).

- (1) Remove the 5 screws attached to the VTR using a screwdriver.
- (2) Align the interface connectors of the VTR and VTR mount base and join them together.
- (3) Tighten the five screws using a screwdriver. Tighten the screws with uniform torque, taking care not to concentrate the force in a single screw.



7-3. VTR and camera coupling direction

- (1) Align the mount base section of the VTR with the rear part of the camera grip and pull down so that the VTR swings in place.
- (2) Tighten the camera/VTR anchor knob.
- (3) To remove the VTR, loosen the same knob, pull apart to separate the VTR from the camera.

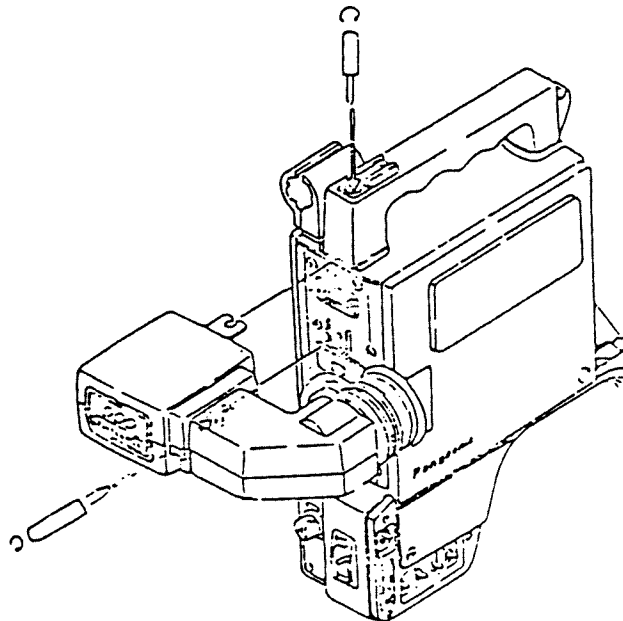


7-4. Mounting the lens

- (1) Rotate the lens lock knob counterclockwise and remove lens cap.
- (2) Mount the lens onto the camera's bayonet mount and rotate the lens lock knob clockwise to tighten it.
- (3) Connect the lens connector to the camera securely.

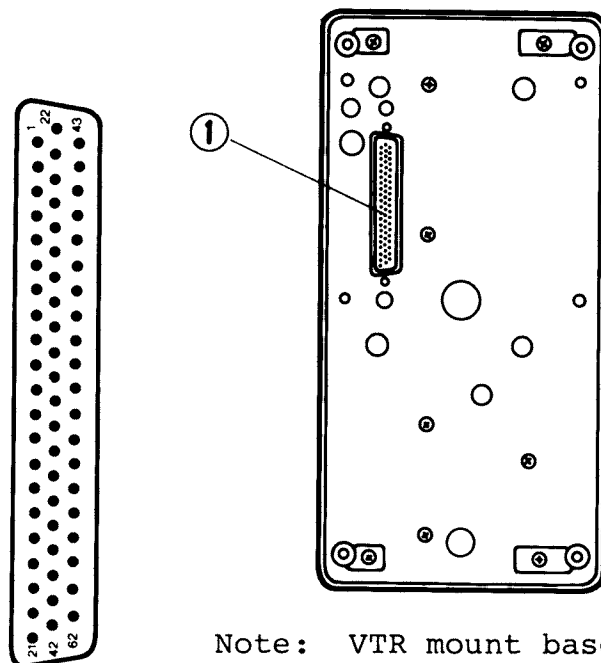
7-5. Removing the 1.5-inch viewfinder

- (1) Loosen the bottom screw on the viewfinder.
- (2) Insert an ordinary screwdriver into the hole located on the front of camera's grip handle and loosen the inside screw.
- (3) Pull the viewfinder to the front of camera to remove it.
- (4) Proceed in the reverse order when mounting the viewfinder.



8. CONTROLS AND THEIR FUNCTIONS

8-1. INTERFACE CONNECTOR SECTION



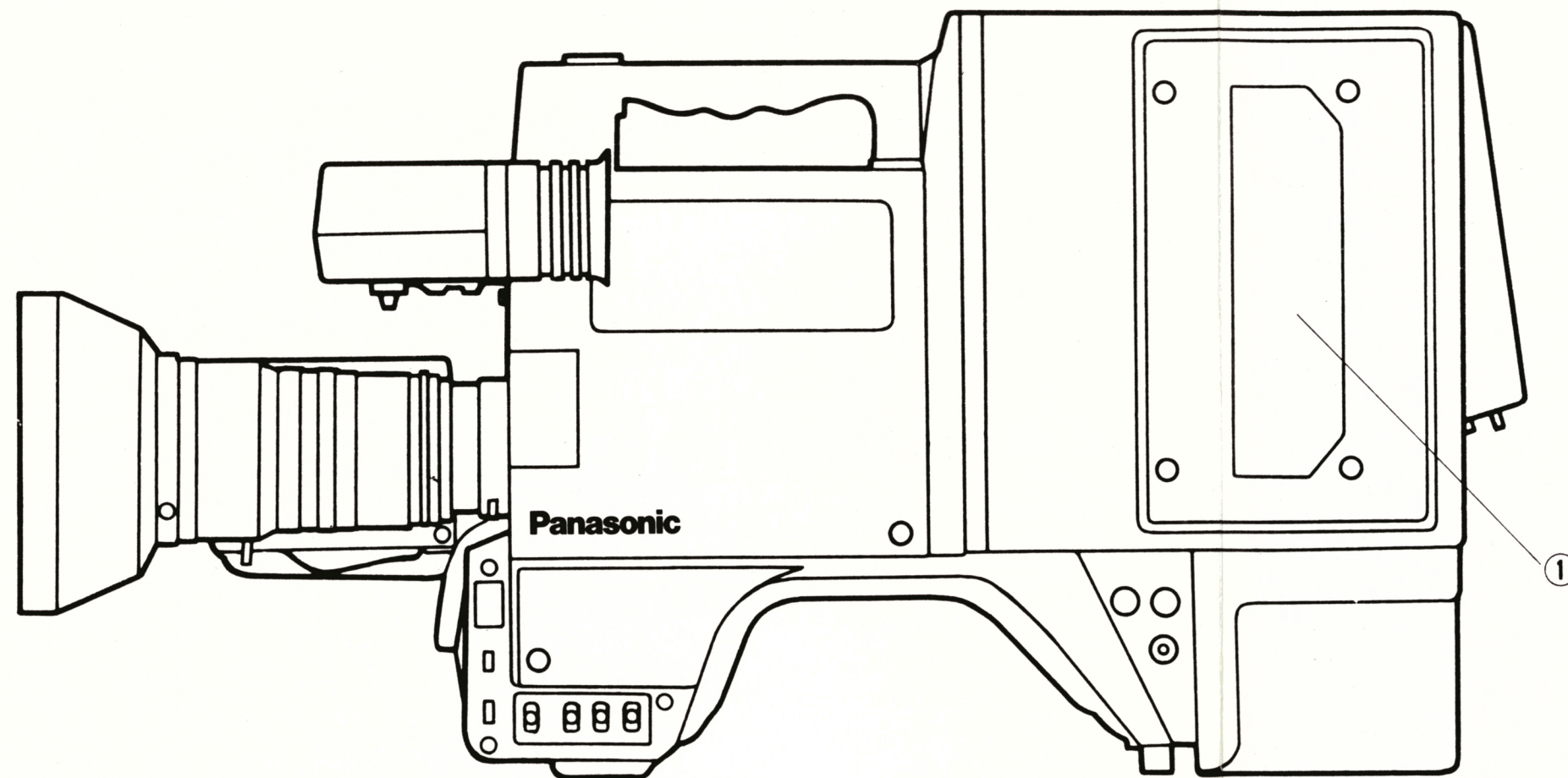
Note: VTR mount base not shown.

1. Interface Connector

It serves to interconnect the camera and VTR electrical signals. The figure above indicates the pin configuration and pin numbers. Signal to pin assignment is given in the table below.

Pin	Description (Note)	Pin	Description (Note)
12	COMPOSITE VIDEO	47	JUMPER
33	COMPOSITE VIDEO GND	53	CH1 AUDIO LEVEL
55	"Y" IN	51	CH1 CONTROL ARM
56	"Y" GND	54	AUDIO GND
26	"Q" IN	32	CH2 AUDIO LEVEL
27	"Q" GND	11	CH2 CONTROL ARM
28	"I" IN	19	VTR GND (13, 60, 61, 62)
29	"I" GND	17	CH1 MONITOR
13	REC COMMAND	30	CH2 MONITOR
62	VTR WARNING	2	POWER +12V
61	VTR TAPE END	5	POWER GND
60	VTR VERIFICATION	31	POWER +12V
34	JUMPER	4	TC GENERATOR POWER

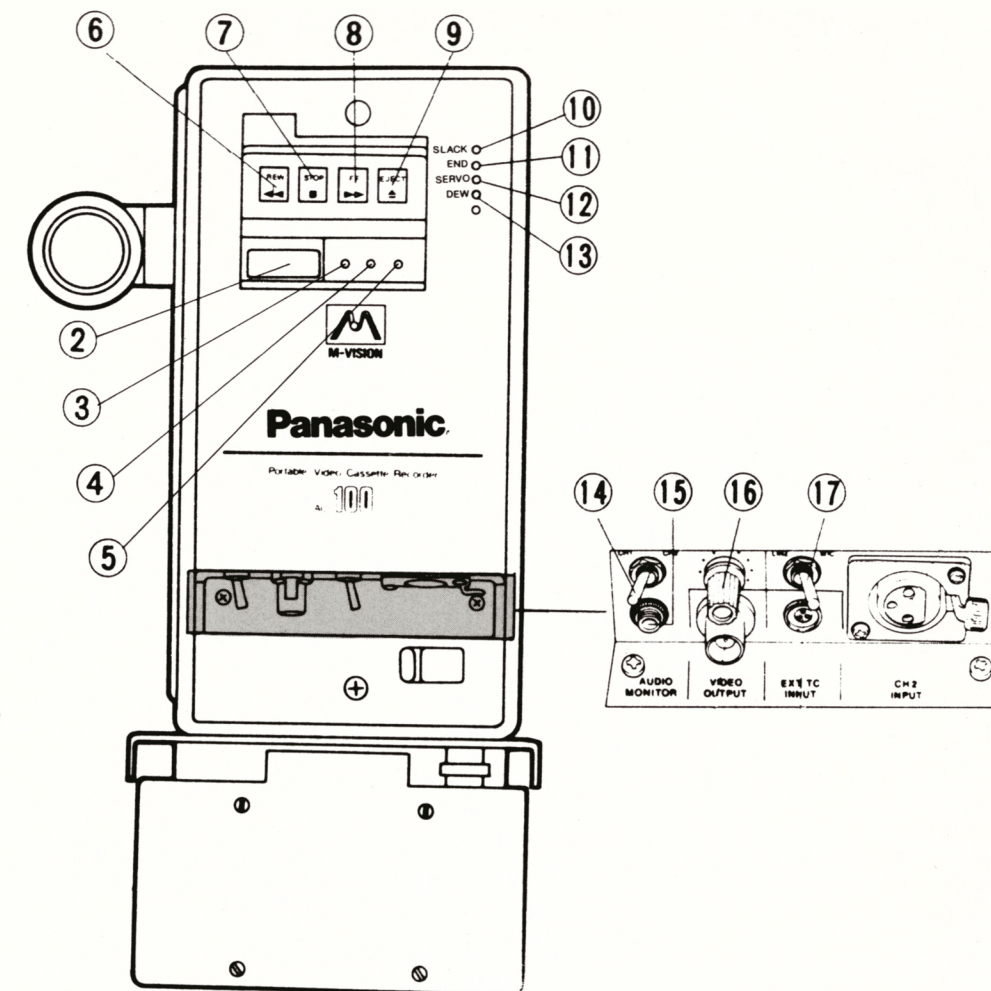
Note: Pins not listed are unused and since they are provided for use with other adaptors, they should not be used for other purposes.



8-2. VTR SECTION

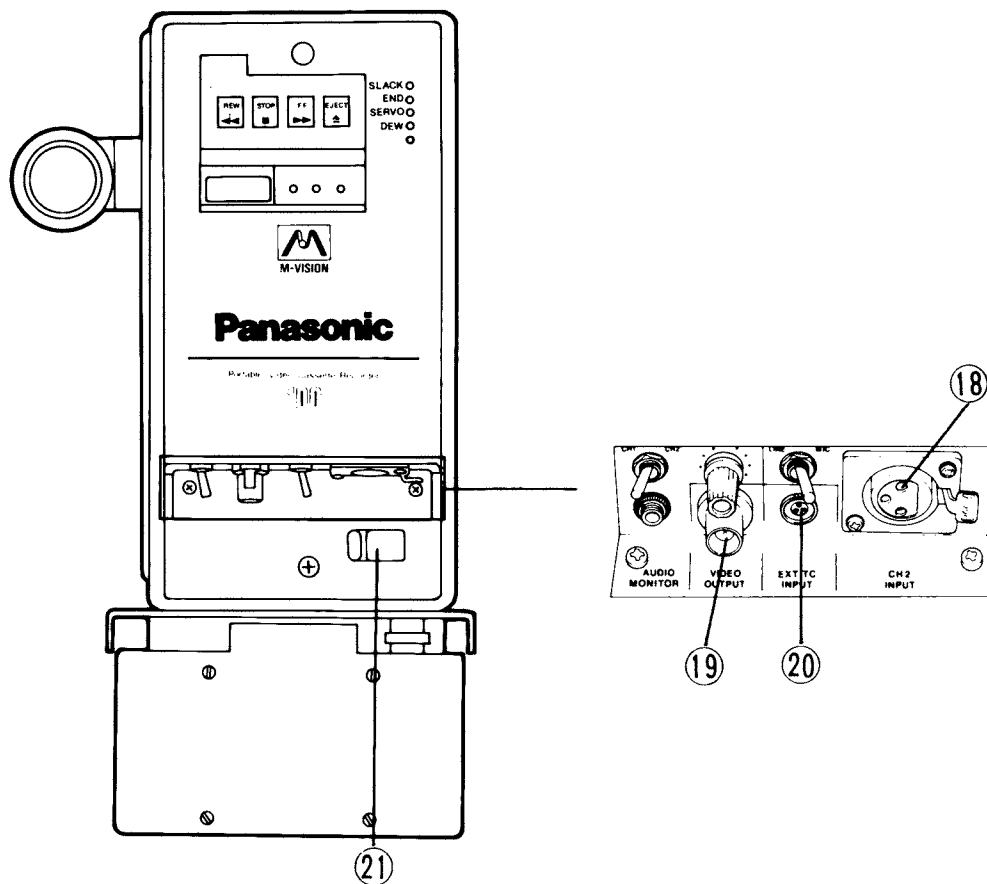
1. Cassette holder
2. Time code generator display
3. START button
This button starts the time code time.
4. SET button
This adjusts the hours and minutes of the time code. When the ADJ and SET buttons are pressed together, the generator display is reset to "000000"
5. ADJ button
This is used to select the hours and minutes when the time code is set.
6. REW button
When pressed, the tape rewinds.
7. STOP button
When pressed, the fast forward or rewind operation is stopped. When pressed in the standby mode, the tape is unloaded and set to the stop mode.

8. FF button
When pressed, the tape fast forwards.
9. EJECT button
When pressed, the tape is ejected.
10. SLACK lamp
This lights if there is something wrong with the tape path. It also lights when the cylinder has stopped rotating.
11. END lamp
This blinks when there is less than one minute of tape left and lights when the tape is at the end.
12. SERVO lamp
This lights when the cylinder or capstan servo is not locked.
13. DEW lamp
This lights when dew has formed on the portable VTR.



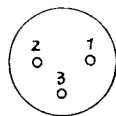
14. AUDIO MONITOR CH1/CH2 switch
This selects the audio channel to be monitored on the AUDIO MONITOR jack.
15. AUDIO MONITOR jack
This is used to connect the earphone when monitoring the sound.
16. AUDIO MONITOR LEVEL control
This adjusts the level of the sound monitored.
17. LINE/MIC switch
This is set to the position corresponding to the equipment connected to the CH2 INPUT connector.
LINE: Set here when recording a line-connected sound source.
MIC: Set here when recording a microphone-connected sound source.

	Reference level
MIC	-60dBm
LINE	+ 4dBm



18. CH2 INPUT connector

This is the input connector (XLR) used when recording sound onto tape track channel 2.



1. GND
2. HOT
3. COLD

19. VIDEO OUTPUT connector

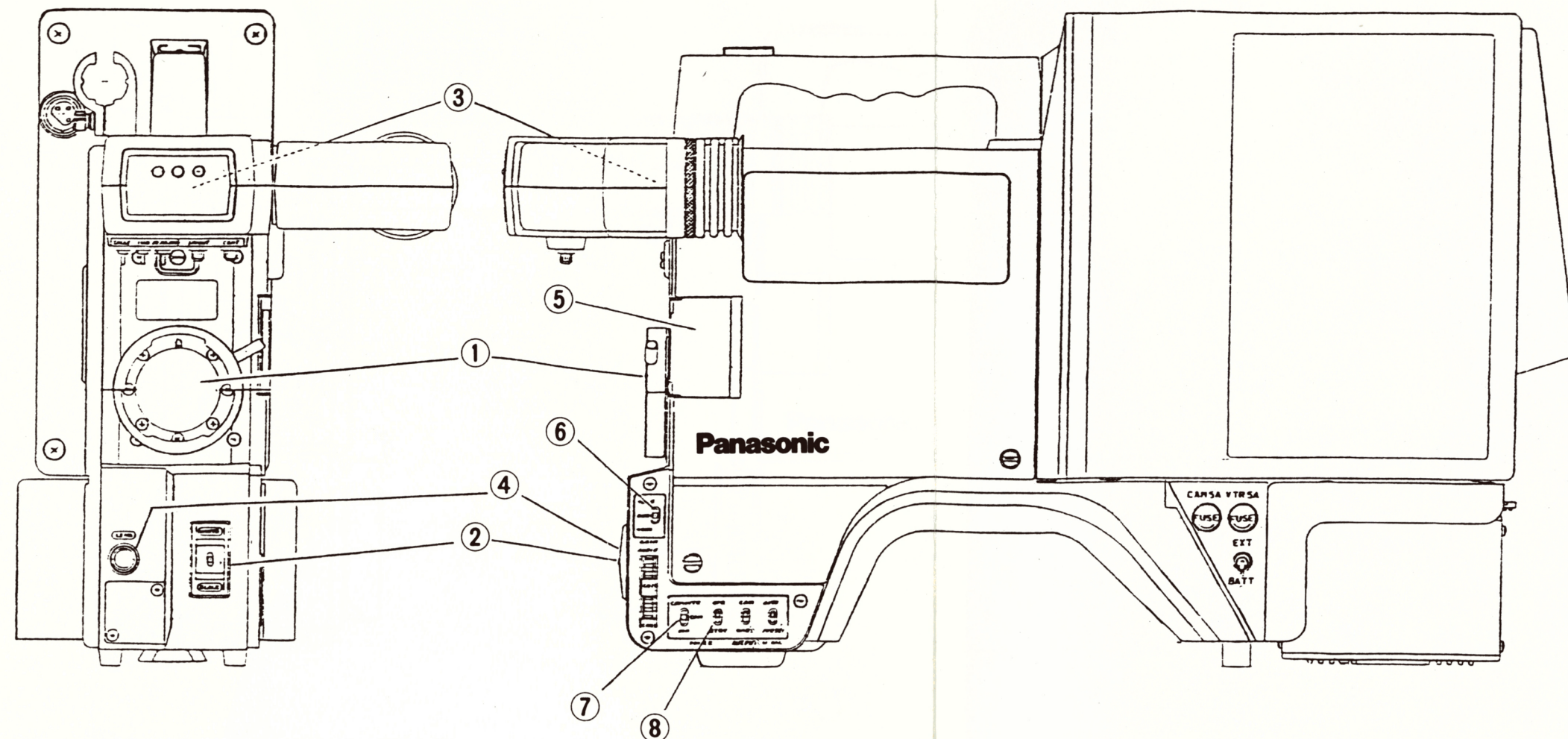
This is the output connector (BNC) for the camera's composite NTSC signal or color bar signal. It is possible to monitor camera's signals when the VTR's power is switched off.

20. EXT TC INPUT connector

This input connector (LEMO) is used when recording the time code using an external time code generator. Switching to this TC source is automatic.

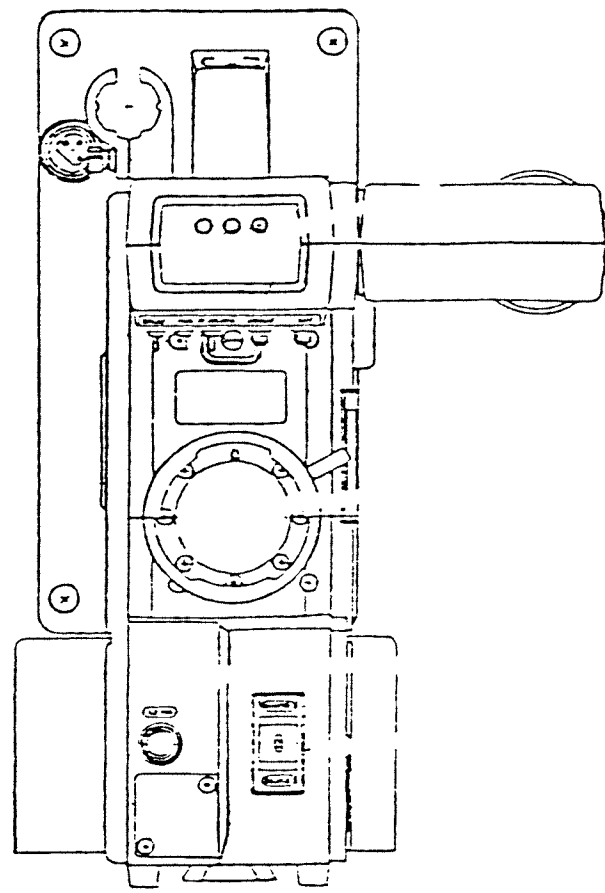
21. MANUAL EJECT

This is used when the cassette tape must be ejected manually. To do this, remove the rubber cap and inserting a screwdriver push down. The cassette holder now pops out. Do not eject a tape which is being loaded since this may damage it.

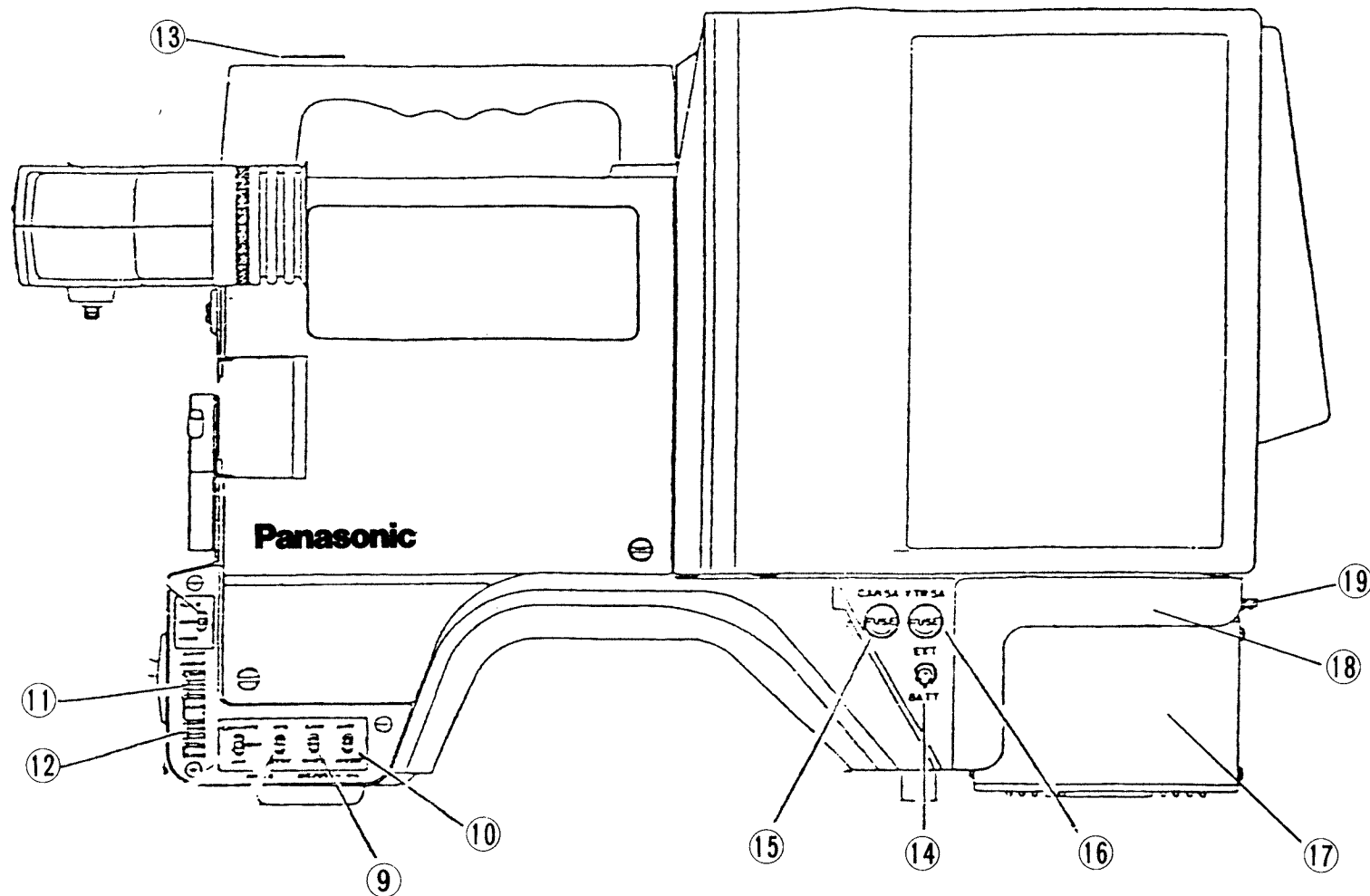


8-3. CAMERA HEAD SECTION

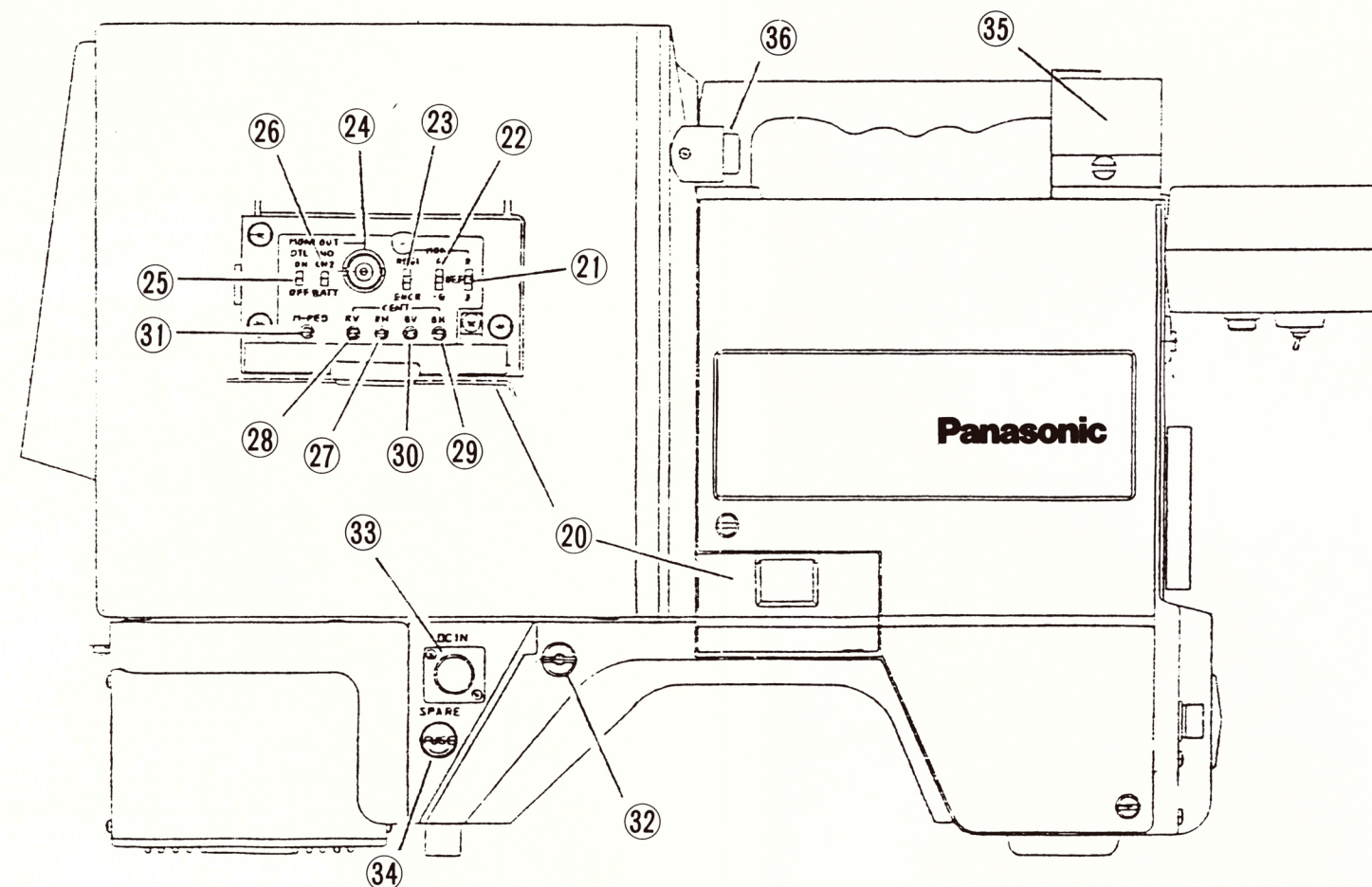
1. Lens mount
This is a bayonet mount. The lens can be attached and removed in a single-twist operation.
2. Auto white/auto black switch
This switch sets auto white balance and auto black balance. When operating this switch, set the lens iris select switch located on the lens to AUTO and the camera's GAIN PRESET/AUTO switch (10) to AUTO. The top setting is for the white balance and the bottom setting for the black balance. Since it takes 2 to 3 seconds for the lens iris to close and open, during black balance operation release the switch after the iris opens again.
3. Connector for viewfinder hook-up
This is used to connect the female viewfinder connector.
4. Connector for lens hook-up
This is used to connect the 8-pin lens connector. The guide pin is at the bottom and the lens connecting cable at the top.
5. Filter compartment
The filters are changed by rotating from top to bottom or bottom to top. Rotate to the clickstop position. For details, refer to the section on operation.
6. High gain switch
This increases the camera's sensitivity electrically.
7. Power switch
This is the camera/VTR power switch. Even after the power has been switched OFF voltage is still supplied to the lens so that the iris automatically closes when the lens iris select switch is in the AUTO position. (This is not the case when the iris is in the manual mode.)
8. Operate/standby switch
The pickup tube heater is kept ON during standby to reduce warmup time. Use this switch when the camera must be put in the standby mode and power conserved.



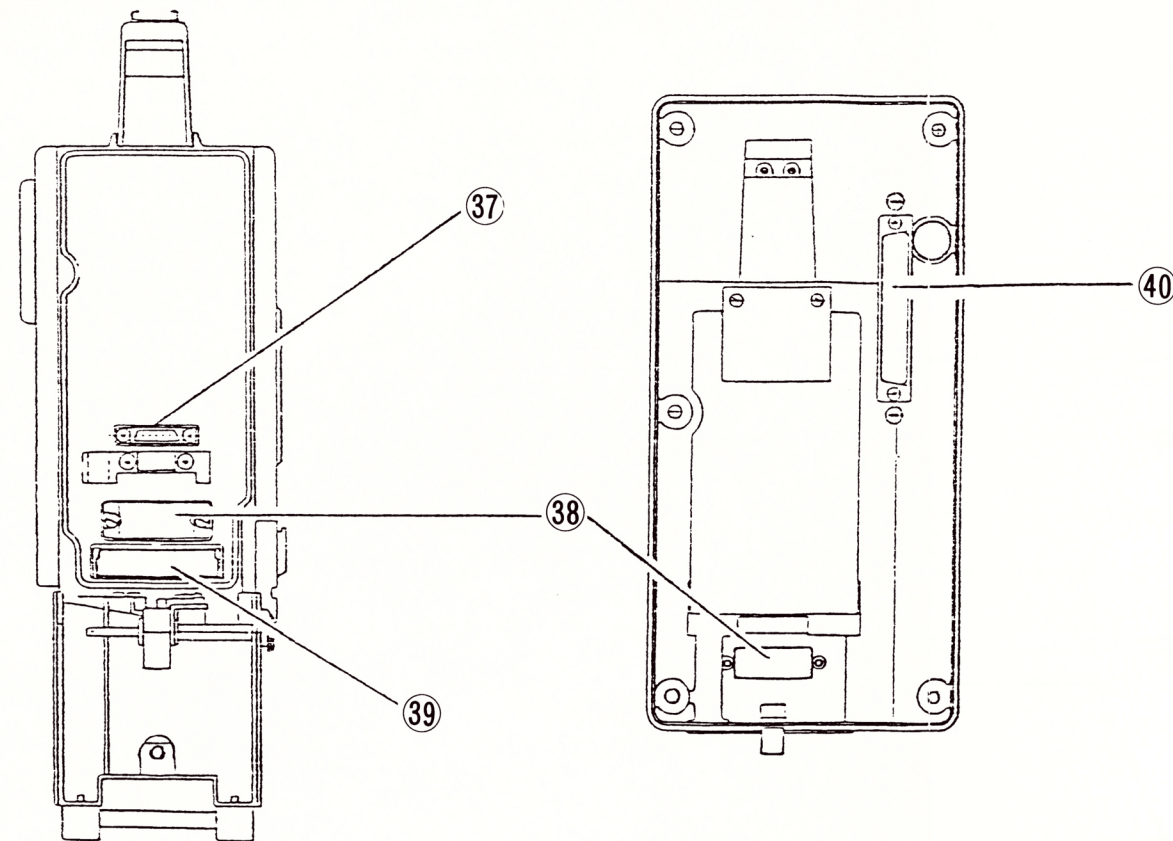
9. Camera/color bar selector switch
Use this switch when EIA color bar signal is desired. A camera number identification signal can be inserted into the color bar signal and when so recorded at the beginning of tapes a particular camera which was used to shoot the material can be identified immediately. For details, refer to the section dealing with the AK-100 circuit description.
10. Gain preset/auto selector switch
Set to the PRESET position when there is no time for auto white balance operation because of sudden news gathering opportunity. This sets the balance for 3200°K. In other situations set the color filter wheel to appropriate position when necessary.



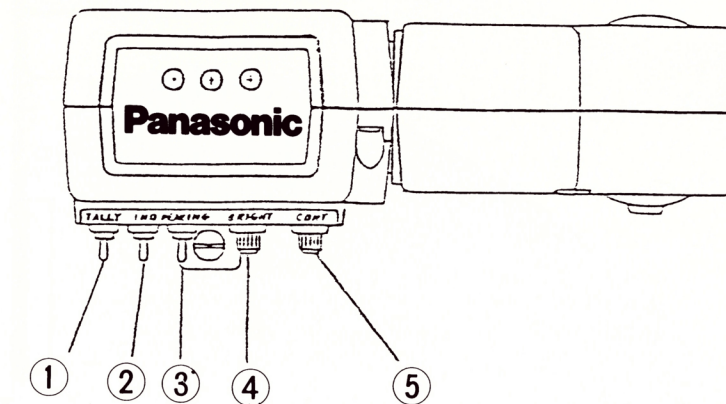
11. CH1 audio level control
This is the channel 1 (microphone with input connector on camera) audio level control.
12. CH2 audio level control
This is the channel 2 (microphone with input connector on VTR) audio level control.
13. Accessory shoe
This is used for mounting an on-board light source.
14. Battery/external power selector switch
This selects the power supply. When the power is turned OFF using this switch, the lens iris is not automatically set to the closed position as in case of 7.
15. Camera fuse
16. VTR fuse
17. Battery
This is the optional battery: SQ-13F (4A).
18. Battery bracket
Snap-in battery bracket
19. Battery securing knob



- | | | |
|--|---|--|
| <p>20. Set-up cover
All switches, controls and connectors required for camera set-up are housed under this cover.</p> <p>21. R/OFF/B selector switch
This switch routes R or B signals to the monitor output connector (24) for camera set-up.</p> <p>22. G/OFF/-G selector switch
This switch selects G or -G for registration adjustments. Set this switch to -G and the R/OFF/B switch to R or B.</p> <p>23. Registration/encoder selector switch
When set to "registration," the video signal selected by switches (21) and (22) is made available at the monitor output. When set to "encoder," the encoder output is made available at the monitor output connector and the luminance signal with the level indicator superimposed is made available in the 1.5-</p> | <p>inch viewfinder. Always set the switch to the "encoder" position after completion of registration adjustments.</p> <p>24. MONITOR output connector
This is used for connecting an external video monitor. The video signal selected by switches (21), (22) and (23) is displayed.</p> <p>25. DTL ON/OFF selector switch
This switches the contour signal ON and OFF. Unless otherwise required, this switch should be ON. Turn OFF during registration adjustments.</p> <p>26. This switch selects the source of lower horizontal white bar VF indicator to either battery voltage or CH2 audio level.</p> <p>27. R-H centering control</p> <p>28. R-V centering control</p> | <p>29. B-H centering control</p> <p>30. B-V centering control</p> <p>31. Master pedestal control
The normal 7.5 IRE pedestal may be raised or lowered using this control.</p> <p>32. Camera/VTR anchoring knob
Loosen and pull to disengage the VTR section.</p> <p>33. External power connector
This is used for powering the camera and VTR using external supply. Mating connector Part NO. is YGXMLR-4-11C (VJS1303).</p> <p>34. Spare fuse holder
A spare 5A fuse is contained here.</p> <p>35. Microphone holder
This is used to clamp the body of the microphone.</p> <p>36. Mic input connector
The signals from this input are recorded on audio channel 1.</p> |
|--|---|--|



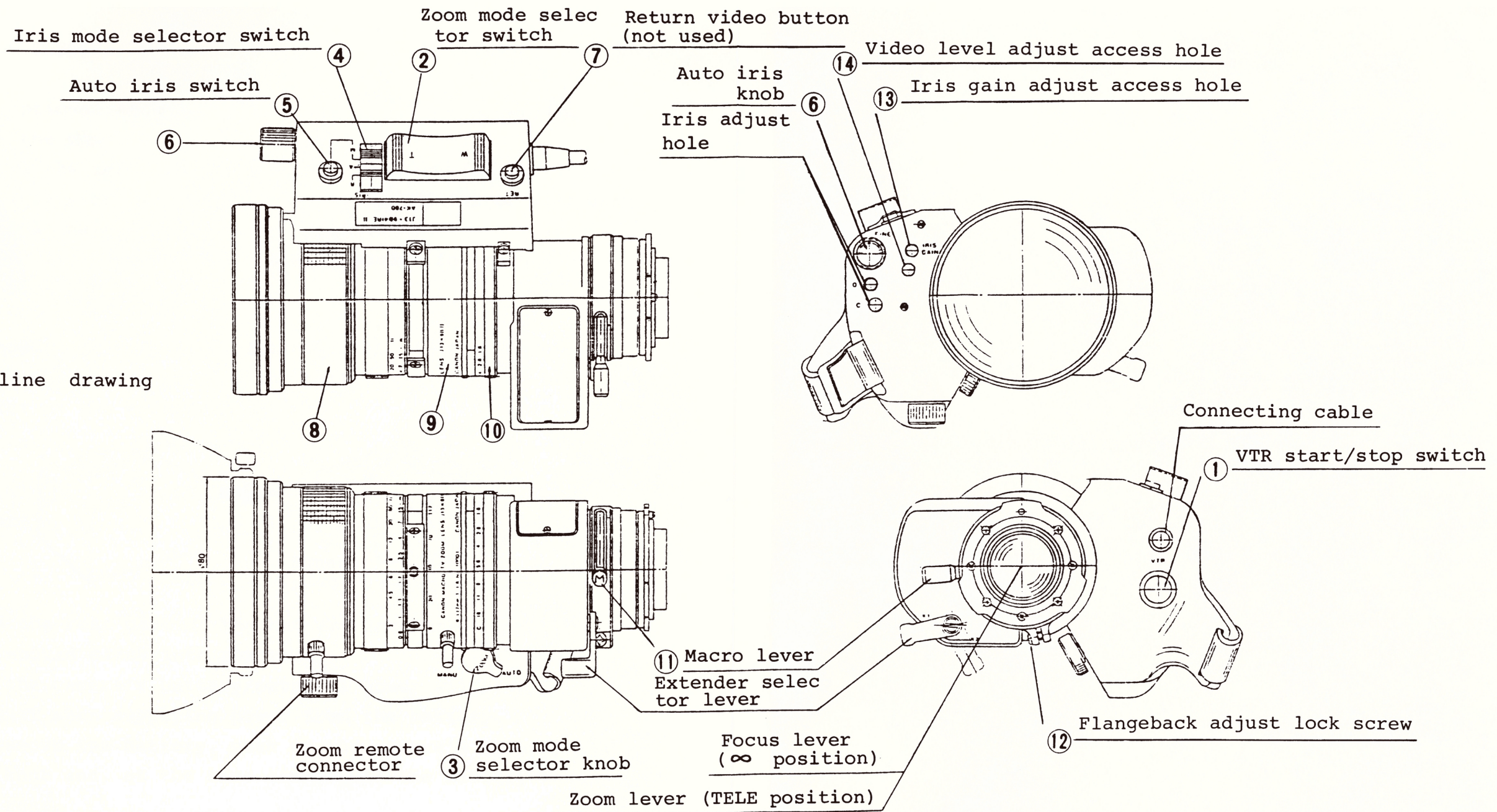
37. Power input connector
Power from the battery or external source is supplied through this connector.
38. Connector for VTR hook-up
Signals to the mating VTR are routed through this connector.
39. GL (gen-lock) adaptor output connector
Signals are transferred through this connector to Gen-Lock Adaptor when used.
40. Interface connector
Interface connector for mating VTR.



8-4. 1.5-INCH VIEWFINDER

1. Talent tally switch
Talent tally (3 LEDs in front of viewfinder) ON/OFF switch.
2. Indicator switch
ON/OFF switch for video/audio battery level indicator on viewfinder screen.
3. High peaker switch
When set to ON, the resolution of the video signal in the viewfinder is increased for easier focusing. A natural video signal is produced when the switch is set to OFF.
4. Brightness control
5. Contrast control

J13X9BIE outline drawing



8-5. LENS SECTION

The Canon J13X9BIE is used in this example.

1. VTR start/stop switch

When pushed once, this switch starts the VTR; when pushed again, it stops the VTR.

2. Zoom mode switch

This switches between W (wide angle) and T (telephoto). Zooming is quick if pushed hard and slow if pushed gently.

3. Zoom mode selector knob

This switches between the motorized and manual zoom modes.

Do not rotate the zoom ring by force in the motorized mode.

4. Iris mode selector switch

This switches between the manual, auto, and remote iris modes.

5. Auto iris button

The auto iris mode is established for as long as this button is pushed in the manual iris mode.

6. Video level control

The iris opening can be increased or decreased by one F stop in the auto iris mode.

7. Return video button

8. Focus ring

9. Zoom ring

10. Iris ring

11. Macro lever

12. Flangeback adjust lock screw

13. Iris gain access hole

14. Auto iris video gain adjust access hole

9. POWER SUPPLY

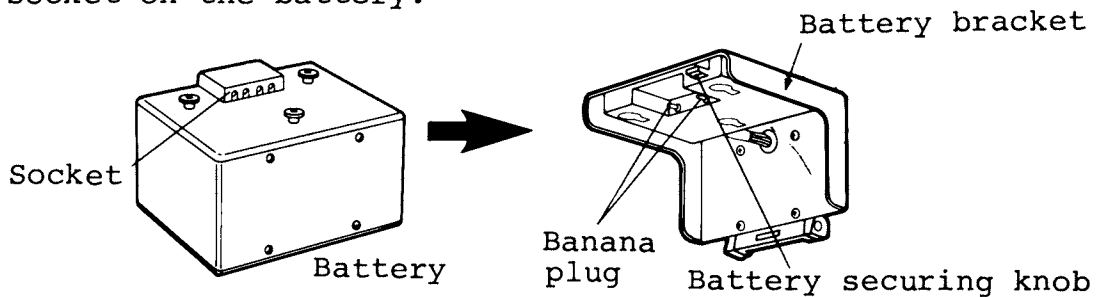
Use the optional battery or the AC adaptor for supplying power to the unit.

When using the battery, first check its condition using the battery indicator inside the camera's viewfinder or with using the optional battery charger (AU-B120).

The optional battery charger is recommended for recharging the battery.

9-1. Connect the battery as follows:

- (1) Align the banana plug on the battery bracket and the socket on the battery.



- (2) Push the rear part of the battery into the mount.
(It should click into position.)
- (3) Set the camera's battery/external power selector switch to BATT when supplying power from the battery.
- (4) To remove the battery, push up the camera's battery securing knob and, at the same time, pull the battery toward the rear.

9-2. Connect the AC adaptor as follows:

- (1) Connect the AC adaptor's DC cord to the external power connector.
- (2) Connect the power cord to the 120V AC outlet.
- (3) Set the camera's battery/external power selector switch to EXT when supplying power from the AC adaptor.

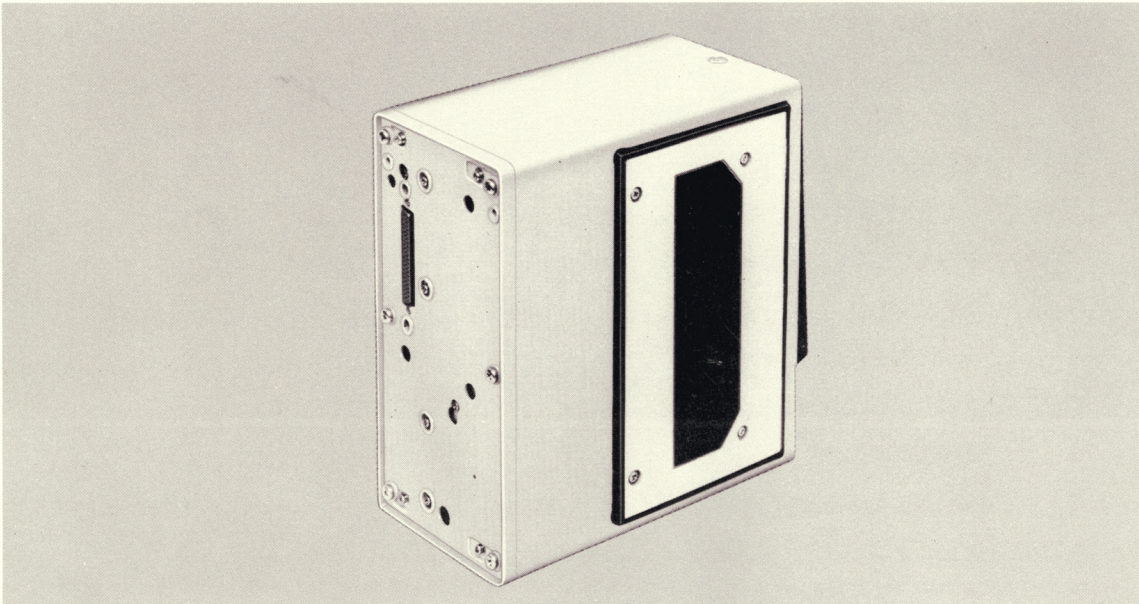
RECAM™

Operating Instructions



PORTABLE VTR

AU-100



Panasonic®

Before attempting to connect, operate or adjust this product, please read these instructions completely.

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WARNING: TO PREVENT FIRE OR SHOCK HAZARD,
DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

WARNING — THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS.

IT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN OPERATED IN A COMMERCIAL ENVIRONMENT.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

1. OVERVIEW

The M-format AU-100 is a record-only video tape recorder unit designed for broadcast and commercial applications. It features the M-format which yields a high picture quality on VHS cassette tapes by using Y and I/Q component recording. Component recording involves recording the luminance signal onto the Y track and the chrominance signal onto an adjacent C track with I/Q FM multiplexing. High-density recording technology is used to obtain Y signal bandwidth of 3.0MHz and a C signal bandwidth of 1.0MHz even though 1/2-inch video tape is used information carrier. A superior picture quality approaching that of a 1-inch VTR is assured.

The VTR is a portable unit which is both compact and lightweight and based on ultra-precision mechanical design. When made part of a system with a camera unit the resulting combination is optimally suited for electronic news gathering (ENG) and electronic field production (EFP) by virtue of superior mobility and picture quality.

When the unit is combined with an NTSC adaptor, it can be used in a wide variety of video shooting applications as an NTSC input compact portable VTR.

A full complement of functions and mechanisms are provided: smooth continuity between scenes with the autoback space mechanism, two audio channels, a built-in SMPTE time code generator, various recording check modes and an antirolling mechanism.

The recording tapes must be played back on the M-format AU-300 editor VTR. A wide range of system possibilities are opened by coupling these video units to other broadcast components or off-line editing systems.

2. FEATURES

1. System configuration with composite-type camera

Connecting the unit with an NTSC video camera yields a picture quality which is almost on a par with that of a 1-inch VTR if an NTSC adaptor (option, AU-S100), which converts the composite NTSC video signal into the Y and I/Q components, is used.

2. High level of picture quality

This portable VTR utilizes the 1/2-inch M-format which yields a high picture quality approaching that of a 1-inch VTR.

3. Y/I/Q recording system

A new system is featured in which the video signal is separated into the Y signal and I/Q signals which are recorded on tape on adjacent tracks.

4. Tape speed

The tape is pulled at a speed of about 8 ips (20 cm) per second and thus a maximum recording time of 20 minutes is available using the NV-T120 HG tape.

5. Simple operation

Only four function buttons are provided: Fast Forward, Rewind, Stop and Cassette Eject. All are feather-touch direct operation buttons. Shooting is enabled or disabled by operating the start/stop switch on the video camera.

6. Auto back space mechanism

When shooting is suspended by pushing the start/stop switch on the video camera, the tape is automatically backspaced for about 30 frames (approx. 1.0 sec.) in preparation for the next shooting. This provides smooth automatic continuity between scenes in the finished product so that the pictures flow naturally.

7. Built-in SMPTE time code generator

The unit incorporates SMPTE time code generator which allows the absolute position of the tape to be located.

The time code is recorded on a special time code track at the same time as the video signals.

8. Two audio channels (600 ohms, balanced) are available for recording audio.

9. Warning mechanisms

The warning indication is provided when the cylinder servo or capstan servo is unlocked, when there is tape slack, when shut-down occurs because of dew.

A lamp also blinks to warn when there is about 1 minute of tape left and the same lamp stays lit at the end of tape.

(Indication is made inside the viewfinder when the unit is used in conjunction with the AK-100 camera.)

3. SPECIFICATIONS

GENERAL

Power requirement: 12V DC
Power consumption: 12W
Recording system: 4 rotary heads, helical scanning, separate
Y/C track system
Tape travel mechanism: M-format (1/2" tape)
Tape speed: 8 ips (204.5 mm/s)
Tape: NV-T120 HG tape
Recording time: 20 min. (NV-T120 HG tape)
Fast forward time: Less than 5 min. (NV-T120 HG tape)
Rewind time: Less than 5 min. (NV-T120 HG tape)
Weight: Approx. 9.02 lbs. (4.1 kgs)
Dimensions: 4-3/4" (W) x 9-3/8" (H) x 10" (D)
120 (W) x 237 (H) x 253 (D) mm

CONNECTORS

Interface: 62 pin
VIDEO OUTPUT: BNC, female, x1
MIC (CH1): XLR, female, x1
AUDIO INPUT (CH2): XLR, female, x1
AUDIO MONITOR: M2, female, x1
EXT TC INPUT: LEMO, female, x1

VIDEO

Television system: NTSC system, 525 lines, 60 fields
Modulation system: Frequency modulation for luminance signal
Frequency modulation multiplexing for
chrominance signal (I/Q)
Horizontal resolution: Over 350 lines (monochrome, color)
Bandwidth: 3.0MHz -1dB for luminance
1.0MHz -1dB for chrominance
Signal-to-noise ratio: Better than 47dB (unweighted) for
luminance
Better than 48dB (unweighted) for
chrominance
(AM and FM component)

Differential gain: Less than 5%
Differential phase: Less than 5°
K-factor (2T pulse): Less than 2%

Inputs

Y: 1.0Vp-p (75% color bar), 75 ohms unbalanced
I: 0.714Vp-p, 75 ohms unbalanced
Q: 0.714Vp-p, 75 ohms unbalanced

Outputs: NTSC composite video, 1.0Vp-p, 75 ohms

AUDIO

Frequency response: 50 ~ 15,000Hz ± 3dB
Signal-to-noise ratio: Better than 50dB
Crosstalk: Better than 40dB

Inputs

MIC: -60dBm, 600 ohms balanced
LINE: +4dBm, 600 ohms balanced } switch selectable

Output: EARPHONE, -20dB ~ -32dB (variable), 8 ohms unbalanced

EXTERNAL TIME CODE

Input: 2.5Vp-p, 600 ohms unbalanced

ENVIRONMENTAL

Ambient temperature

Operating: 32°F - 104°F (68°F reference temperature)

Storage: -4°F - 140°F

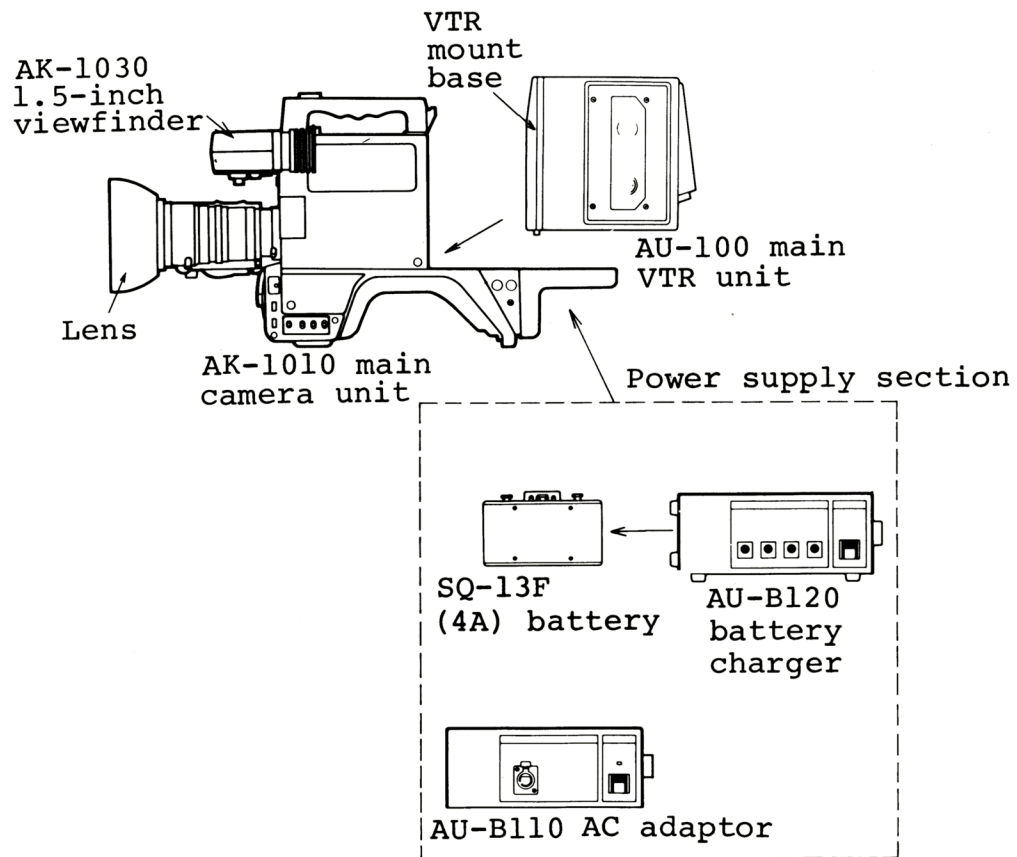
Ambient humidity: 20% - 85% (50% reference humidity)

Weight and dimensions shown are approximate.

Specifications are subject to change without notice.

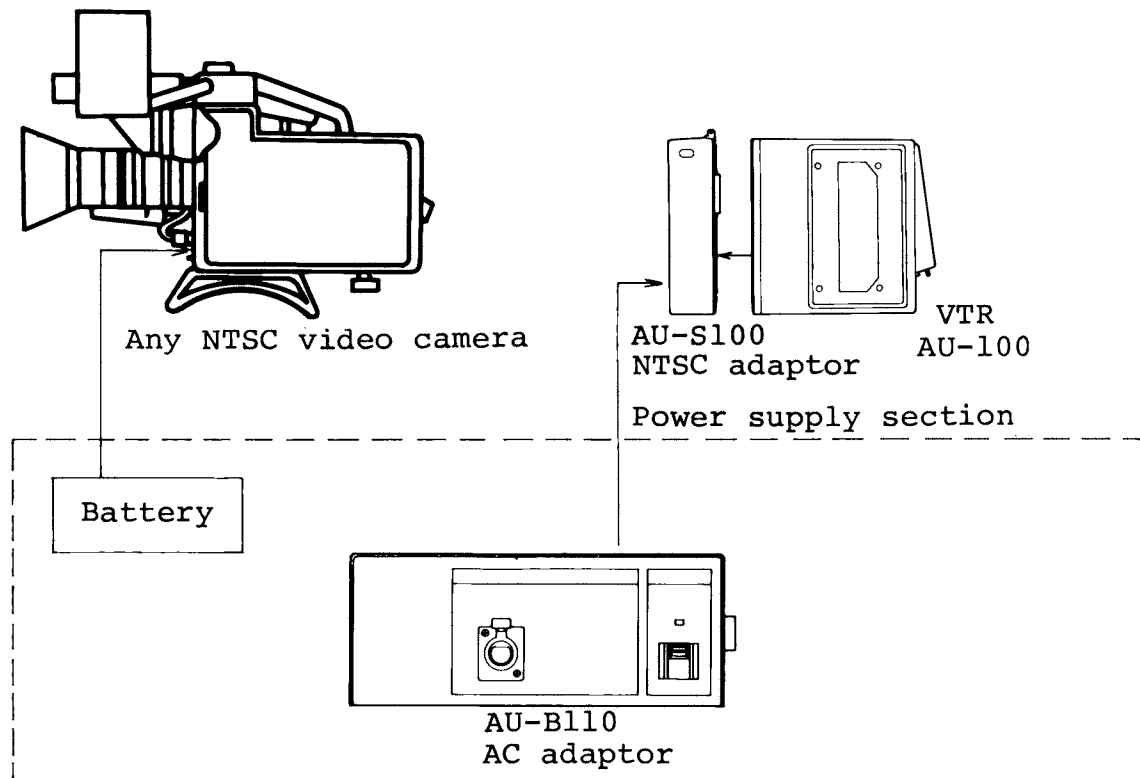
4. SYSTEM CONFIGURATION

4-1. AK-100 COLOR CAMERA AND AU-100 SYSTEM DIAGRAM



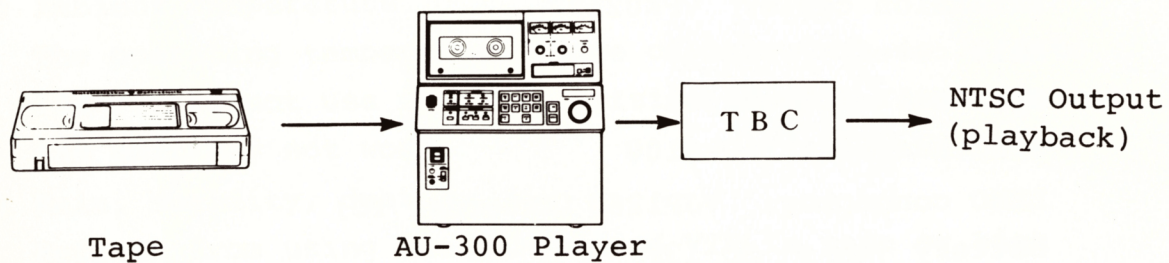
- With a full charge the SQ-13F will last for about 100 minutes of continuous recording.
- The AU-B120 battery charger is designed to recharge SQ-13F battery. The charging time depends on the environmental conditions although at 68°F charging takes about 2 hours for the SQ-13F.

4-2. NTSC COMPOSITE VIDEO CAMERA AND AU-100 SYSTEM DIAGRAM

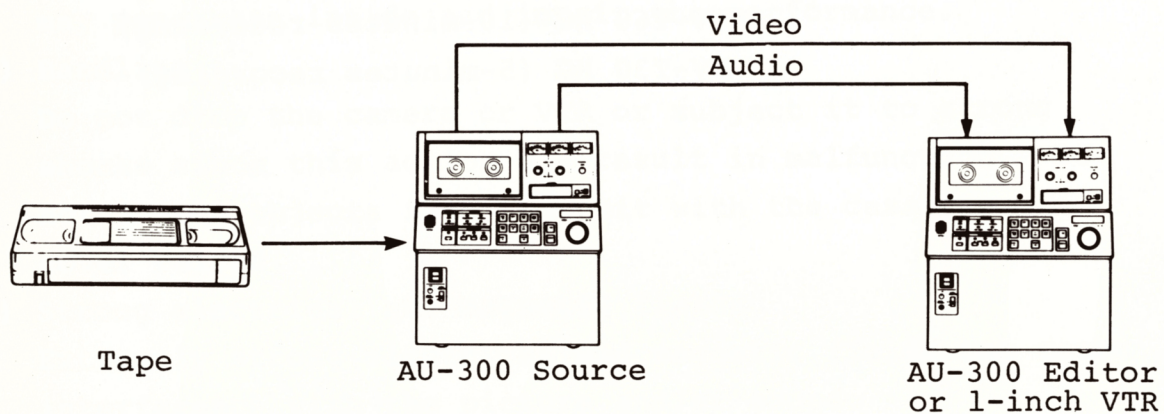


4-3. PRE-RECORDED TAPE EDITING SYSTEM DIAGRAM

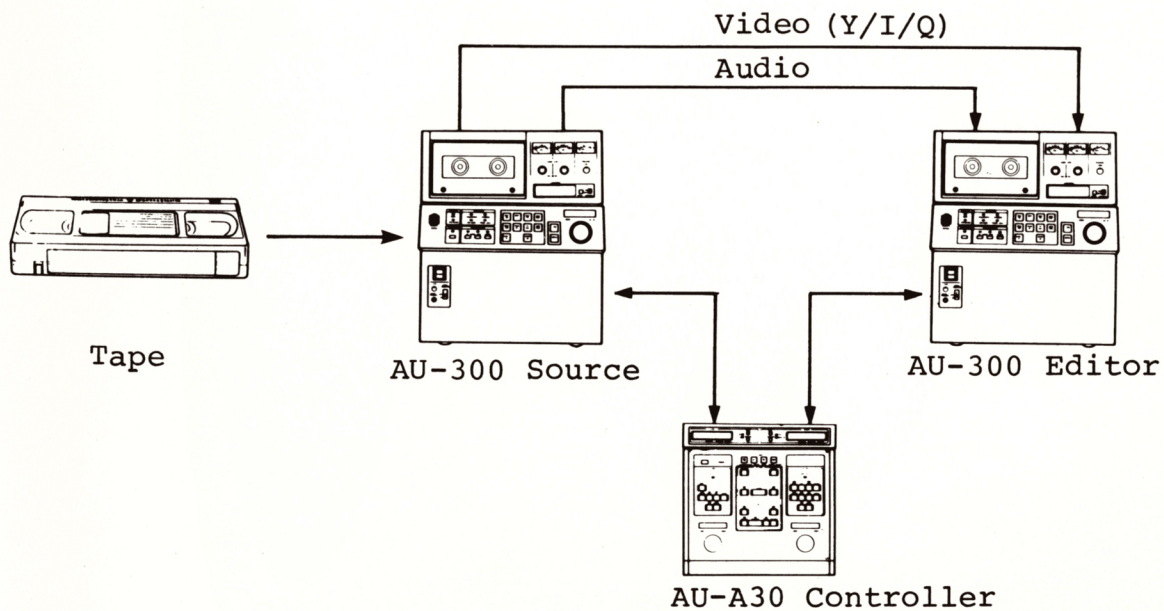
1. To play back a tape recorded on the AU-100



2. To manually dubbing a tape recorded on the AU-100



3. To edit a tape recorded on the AU-100 with the AU-A30 controller



5. COMPOSITION

AU-100 standard configuration

1. Main VTR unit: AU-100
2. Standard accessories
 - Extension cable: VFK0219
 - Rain cover: VFB0040
3. Optional accessories
 - NTSC adaptor: AU-S100
 - LEMO connector: VJPl268 (External TC)
 - Battery (4A): SQ-13F
 - Battery charger: AU-B120
 - AC adaptor: AU-B110
 - Cassette tapes: NV-T120 HG (20-minutes recording)
 - NV-T60 HG (10-minutes recording)
 - NV-T30 HG (5-minutes recording)

6. PRECAUTIONS FOR USE

(1) Vibration

Avoid using the unit in a location susceptible to vibrations.

(2) Ambient temperature

The operating temperature range of this unit is 32°F to 104°F. Do not use the unit outside of this range since the unit may not work.

(3) Rain, humidity, dust

Refrain from using the camera and VTR in rain or high levels of humidity. Dew will form inside the unit which may result in malfunctions.

If the camera is used in a dusty environment, the dust may penetrate inside and impair the performance.

(4) Handling

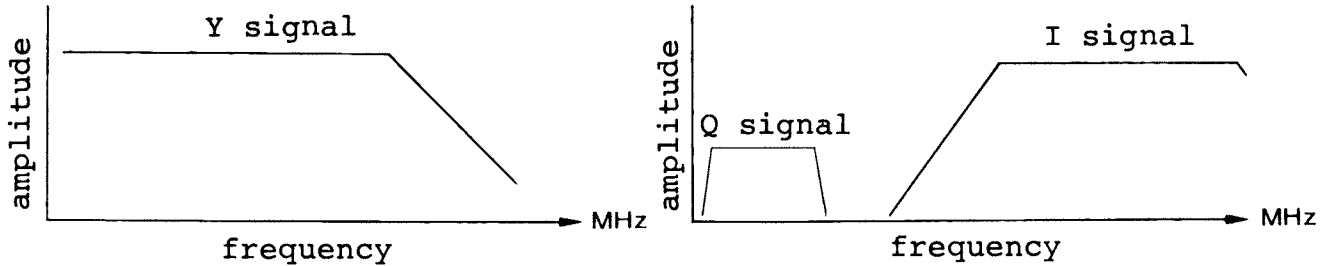
Do not drop the camera or VTR or subject it to strong shocks since this action may result in malfunction. Do not insert objects into the unit with the cassette cover raised.

(5) Strong electrical and magnetic fields

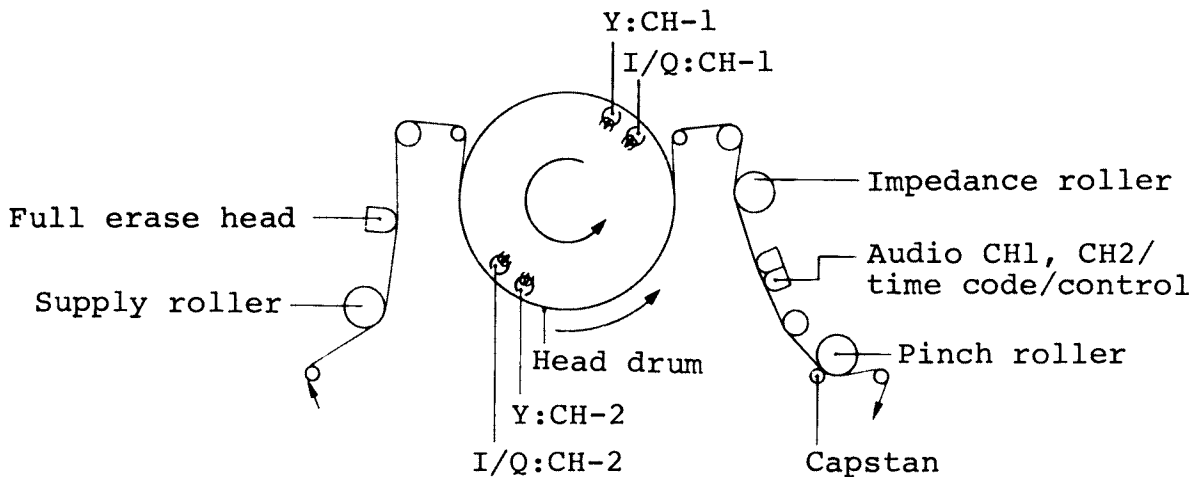
Extremely strong electrical and magnetic fields can cause interference with the picture and/or sound.

7. RECORDING SYSTEM

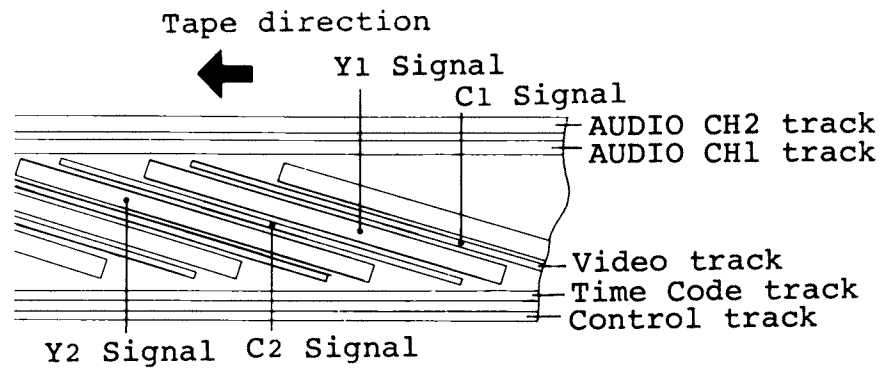
The AU-100 VTR/camera combination adopts a new recording system where the Y, I and Q signals from the video camera are recorded on 2 adjacent video tracks. The Y signal is recorded on one track and the C (I/Q) signal is recorded on the other video track.



The tape transport of the AU-100 VTR/camera combination is shown in the figure below. There are 4 video recording heads. The video signal is separated into the Y and I/Q signals prior to be recorded.



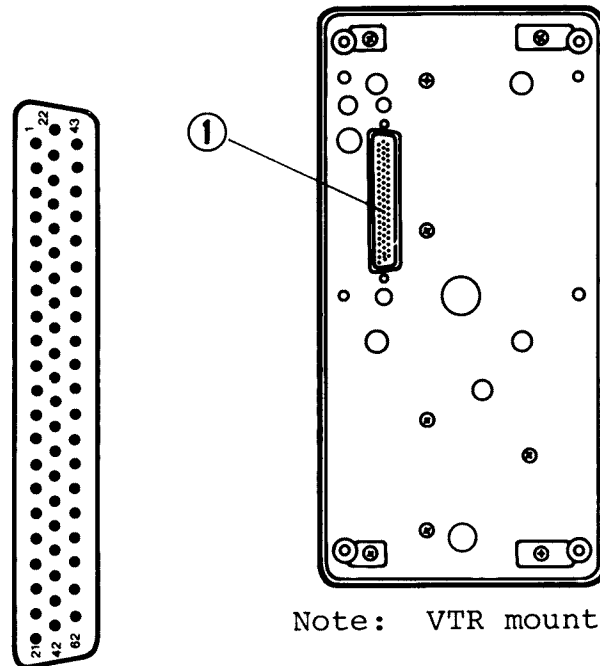
As shown in the figure, the two video signals, two audio signals and time code/control signals are recorded on their respective tracks on the tape. The tape moves at a speed of about 8 ips (20 cm/sec). This is about 6 times the speed of the standard VHS type VTR.



Note: Recordings made on this unit cannot be played back on a standard VHS recorder.

8. CONTROLS AND THEIR FUNCTIONS

8-1. INTERFACE CONNECTOR SECTION



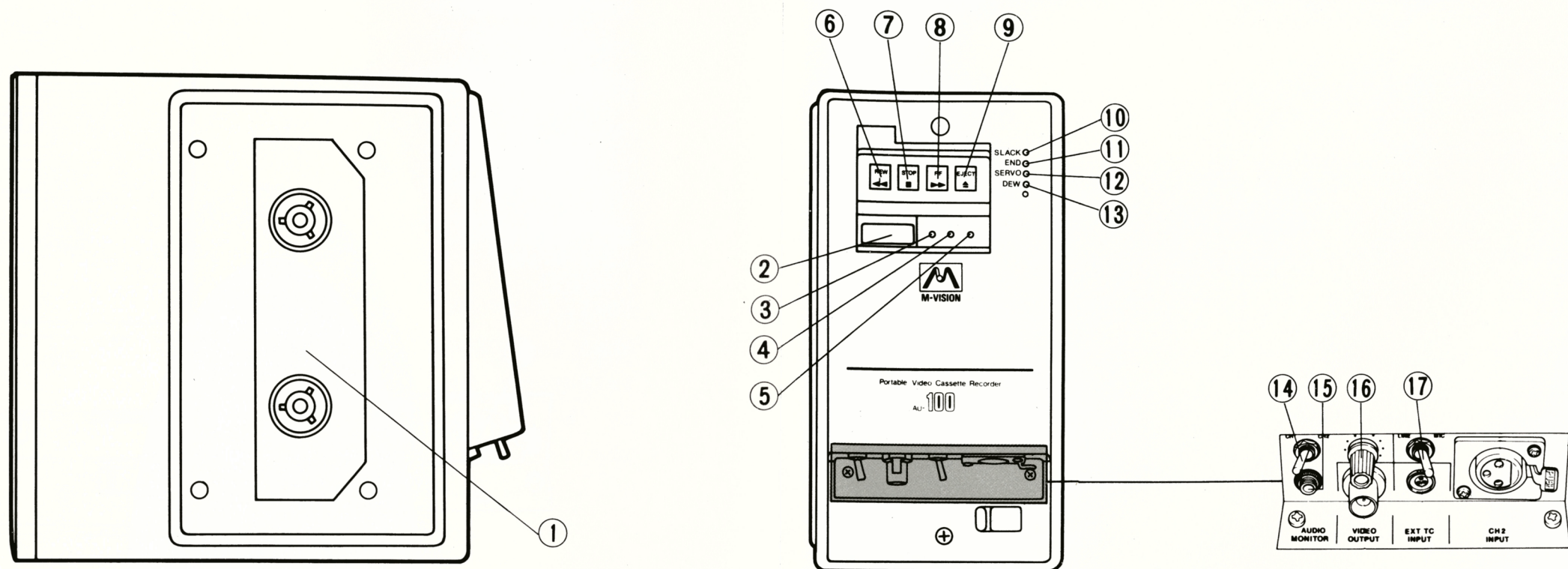
Note: VTR mount base not shown.

1. Interface Connector

It serves to interconnect the camera and VTR electrical signals. The figure above indicates the pin configuration and the pin numbers. Signal to pin assignment is given in the table below.

Pin	Description (Note)	Pin	Description (Note)
12	COMPOSITE VIDEO	47	JUMPER
33	COMPOSITE VIDEO GND	53	CH1 AUDIO LEVEL
55	"Y" IN	51	CH1 CONTROL ARM
56	"Y" GND	54	AUDIO GND
26	"Q" IN	32	CH2 AUDIO LEVEL
27	"Q" GND	11	CH2 CONTROL ARM
28	"I" IN	19	VTR GND (13, 60, 61, 62)
29	"I" GND	17	CH1 MONITOR
13	REC COMMAND	30	CH2 MONITOR
62	VTR WARNING	2	POWER +12V
61	VTR TAPE END	5	POWER GND
60	VTR VERIFICATION	31	POWER +12V
34	JUMPER	4	TC GENERATOR POWER

Note: Pins not listed are unused. Since they are provided for use in connection with other adaptors they should not be used for other purposes.



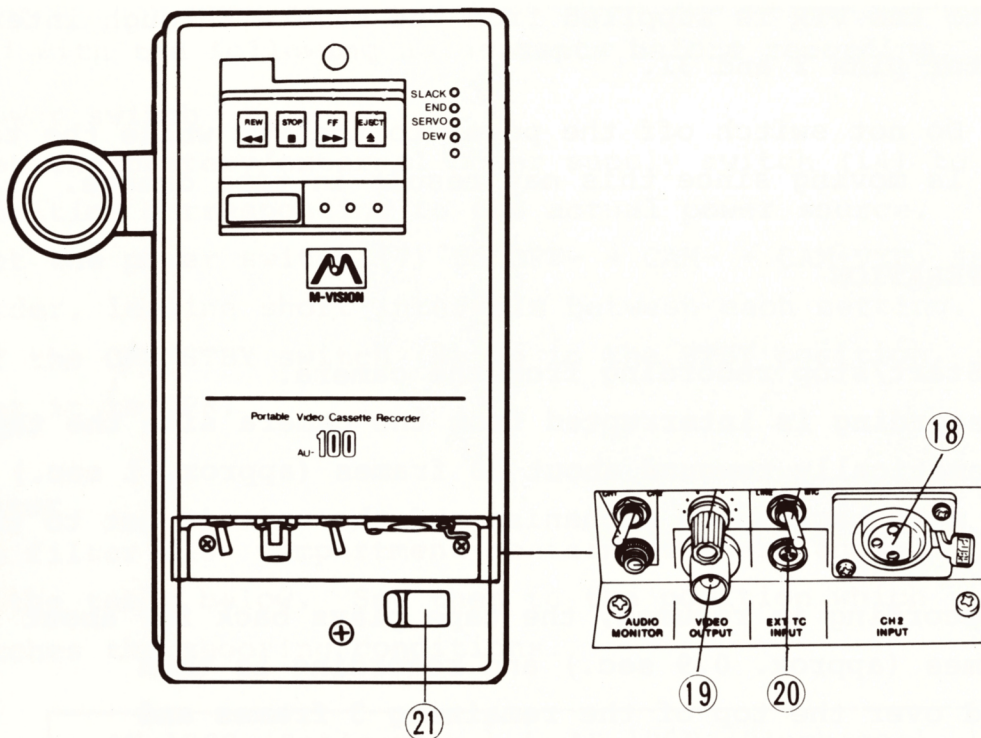
8-2. VTR SECTION

1. Cassette holder
2. Time code generator display
3. START button
This button starts the time code time.
4. SET button
This adjusts the hours and minutes of the time code. When the ADJ and SET button are pressed together, the generator display is reset to "000000".
5. ADJ button
This is used to select the hours and minutes when the time code is set.
6. REW button
When pressed, the tape rewinds.
7. STOP button
When pressed, the fast forward or rewind operation is stopped. When pressed in the standby mode, the tape is unloaded and set to the stop mode.

8. FF button
When pressed, the tape fast forwards.
9. EJECT button
When pressed, the tape is ejected.
10. SLACK lamp
This lights if there is something wrong with the tape path. It also lights when the cylinder has stopped rotating.
11. END lamp
This blinks when there is less than one minute of tape left and lights when the tape is at the end.
12. SERVO lamp
This lights when the cylinder or capstan servo is not locked.
13. DEW lamp
This lights when dew has formed on the portable VTR.

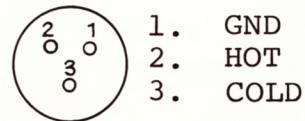
14. AUDIO MONITOR CH1/CH2 switch
This selects the audio channel to be monitored on the AUDIO MONITOR jack.
15. AUDIO MONITOR jack
This is used to connect the earphone when monitoring the sound.
16. AUDIO MONITOR LEVEL control
This adjusts the level of the sound monitored.
17. LINE/MIC switch
This is set to the position corresponding to the equipment connected to the CH2 INPUT connector.
LINE: Set here when recording a line-connected sound source.
MIC: Set here when recording a microphone-connected sound source.

	Reference level
MIC	-60dBm
LINE	+ 4dBm



18. CH2 INPUT connector

This is the input connector (XLR) used when recording sound onto tape track channel 2.



19. VIDEO OUTPUT connector

This is the output connector (BNC) for the camera's composite NTSC signal or color bar signal. It is possible to monitor camera's signals when the VTR's power is switched off.

20. EXT TC INPUT connector

This input connector (LEMO) is used when recording the time code using an external time code generator. Switching to this TC source is automatic.

21. MANUAL EJECT

This is used when the cassette tape must be ejected manually. To do this remove the rubber cap and inserting a screwdriver push down. The cassette holder now pops out. Do not eject a tape which is being loaded since this may damage it.

9. POWER SUPPLY

Power to the VTR is supplied from the camera through interface connector pins 2 and 31.

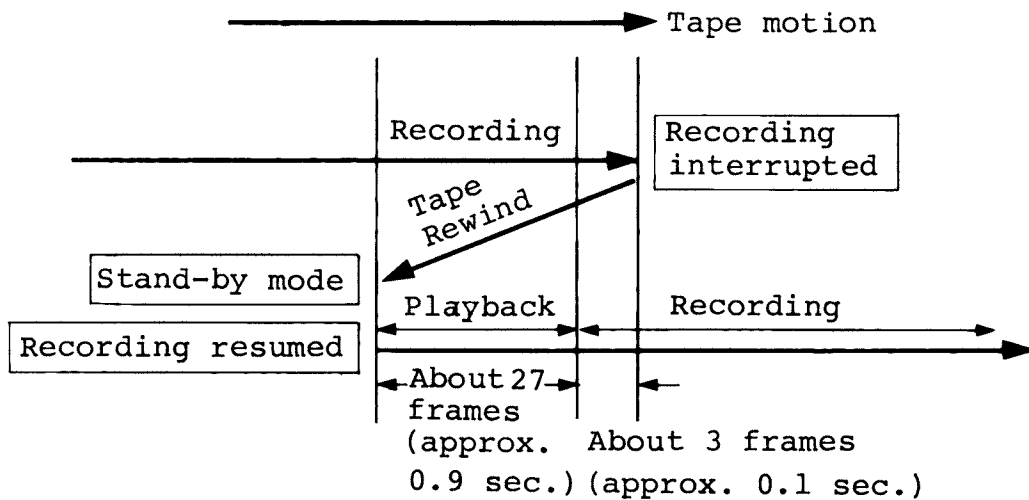
Note: Do not switch off the power to the VTR while the tape is moving since this may result in tape damage.

10. OPERATION

10-1. Start/stop recording from the camera.

When recording is interrupted from the camera side the tape is automatically rewound about 30 frames (approx. 1 sec.) by the auto back space mechanism and the unit is set to the stand-by mode.

When recording is resumed, the tape plays back for about 27 frames (approx. 0.9 sec.) and recording is then resumed over the top of the remaining 3 frames and beyond this point.



10-2. OPERATION WITH THE AK-100 CAMERA

When the VTR is used in combination with the AK-100 camera, proceed with the following adjustments before recording.

(1) Power switch

Set the battery/external power supply switch (14) to the position corresponding to the actual power source.
Set the power switch (7) to OFF- → CAM- → CAM+VTR, in that order, leaving short intervals between each setting.
If the OPR/STBY switch (8) is in the STBY position, set it to OPR.

(2) Filter

The filter disk compartment contains filters shown in the table below. Set then to the position which matches the shooting conditions.

AK-100S (Saticon)		AK-100P (Plumbicon)			
CC & ND		CC		ND	
0	CLOSED	A	3200°K	1	100%
1	3200°K	B	4700°K	2	25%
2	4700°K	C	5600°K	3	6.5%
3	5600°K+25% ND	D	7500°K	0	CLOSED

Using the CC (color conversion) filter

3200°K: Lighting under incandescent lamp or halogen lamp, etc.

4700°K: Lighting under fluorescent lights

5600°K: Lighting under sun in clear daylight

7500°K: Outdoor light in cloudy sky, or after sundown

Use the ND filter under bright illumination and also when increased depth of field is desired.

At all other times, set to the 100% position.

(3) Lens

The zoom switch and the VTR start/stop switch should be operated using the right hand while the focus ring, zoom ring (with manual zoom) and iris ring (with manual iris) should be operated using the left hand.

A motorized/manual zoom selector switch is provided for zoom operation and an auto/manual/remote selector switch for iris operation. When the video camera and VTR are used in combination, the remote iris function is not operational. The auto iris mode is established while the auto iris button is kept depressed in the manual mode. It is used for obtaining the proper exposure on a temporary basis. The video level control enables the iris optimum value (center clickstop position) to be varied by ± 1 stop.

This function is used to advantage in quick scene changing situations. Optimum performance is realized when the iris is set between f4 - f11.

For further details, refer to the lens instruction booklet.

(4) Auto white, auto black balance adjustment

The auto white and black balance information when set, remains in camera's digital memory for recall even after the power is turned OFF. Proceed as follows when the shooting light conditions are changed.

(a) Set the color balance switch (10) on the side panel of the camera to AUTO and the iris selector switch on the lens to AUTO positions.

(b) Zoom in on a white object in the vicinity of the subject so that it fills the entire screen.
Set the auto white/black switch (2) on the camera front panel to WHITE and hold up until the WARNING lamp lights indicating completion of auto white balance process.

(It takes about a second.) (See Figure on P29).

(c) Set the auto white/black switch (2) to BLACK and confirm that the lens iris closes. Release the switch after the WARNING lamp in the viewfinder lights indicating completion of black balance.
The lens should reopen.

(d) Repeat the white balance as in (c).

(5) Indicators inside viewfinder

(a) Viewfinder operation

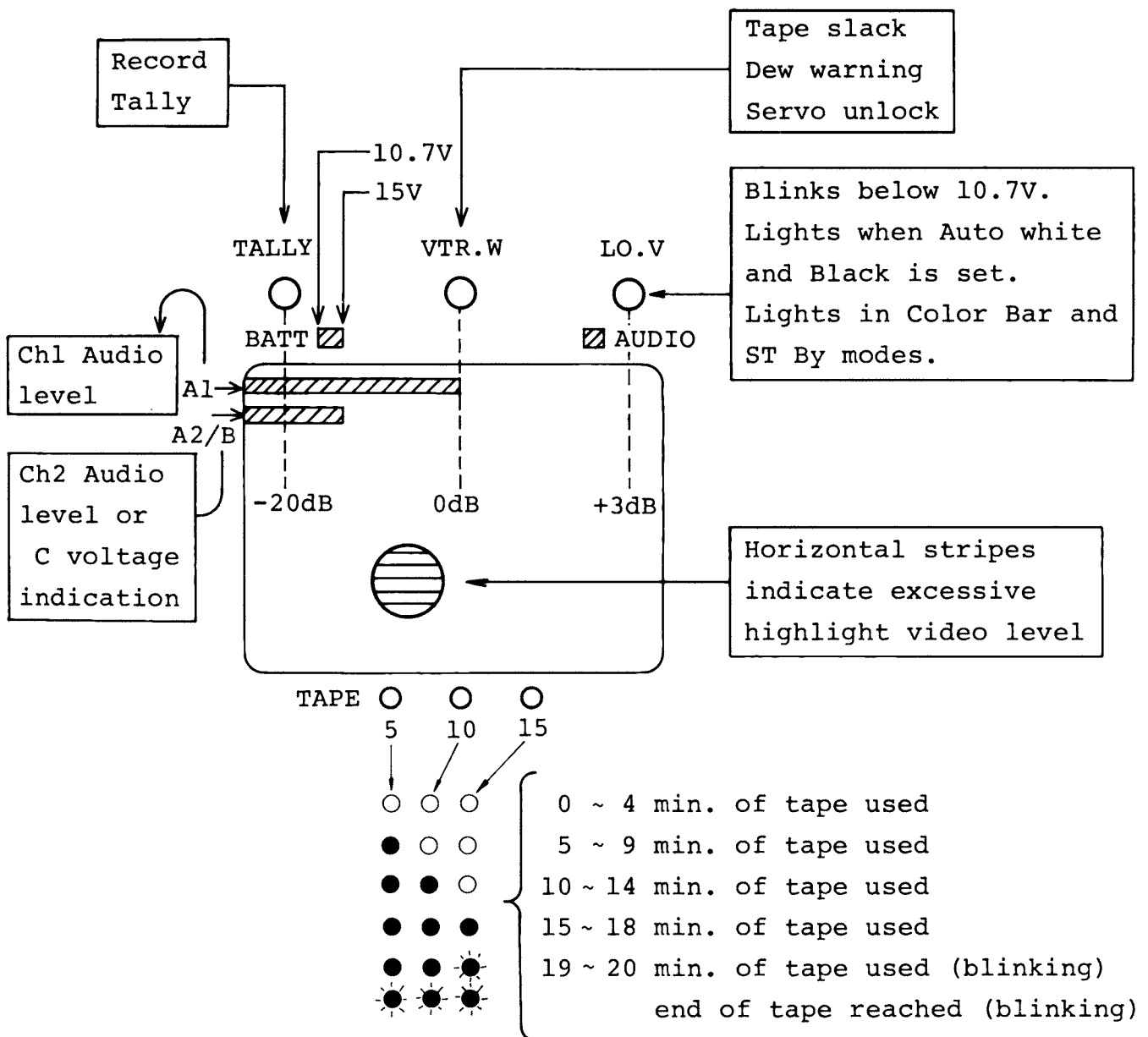
Contrast/Brightness controls: Adjust for a clear picture.

High peaker ON/OFF: Focusing is easier if ON.

Tally ON/OFF: ON/OFF talent tally (front of viewfinder) switch

Indicator ON/OFF: Video indicator, audio indicator, battery indicator switch

(b) Indicators inside viewfinder



(6) Audio level adjustment

The unit has two audio tracks and two respective inputs:

CH1: The input signal from the XLR connector located on the top of the docking plate is recorded.

(Input level -60dBm)

CH2: Signal from input connector located on rear panel of VTR is recorded (-60dBm or +4dBm switchable).

The input levels of the two channels can be set using the CH1 audio level control (11) and CH2 audio level control (12) on the front of the camera.

The CH1 and CH2 levels are indicated by horizontal white bars at the top of the picture inside the viewfinder.

Adjustment should be made so that the bars reach a line under the VTR W. LED at the desired sound peak (for normal level or tape 0VU level on the tape).

A line under the TALLY LED corresponds to -20dBm and a line under the LO.V corresponds to +3dBm level.

(7) GAIN PRESET/AUTO switch

When this switch is set to the PRESET position, the camera is set to 3200°K studio light source.

This position may be used when there is no time to adjust the auto white balance. Set filter wheel to appropriate position when necessary.

(8) GAIN +9dB/0dB/+18dB switch

In the +9dB position the sensitivity is increased by about 1.5 F-stops; and in the +18dB position, it is increased by about 3 F-stops. Noise appears with raised sensitivity.

(9) Recording start

Recording is started using the VTR start/stop switch. For details on the operation of the VTR, read the AU-100 Instruction Manual.

The amount of tape consumption is displayed by LEDs inside the camera's viewfinder. Refer to section (5)-(b).

Imminent tape end is indicated when the right-hand LED starts to blink. No tape is left when all 3 LEDs blink or when the rear panel END lamp is lit.

10-3. RECORDING ONTO AUDIO CH2

The sound from the microphone mounted on the video camera is recorded on audio CH1. Proceed as follows when recording any other sound source.

- (1) Connect the other audio source (such as another microphone) to the CH2 INPUT connector (XLR type) on the rear of VTR.
- (2) Set the LINE/MIC switch to MIC when a microphone has been connected and to LINE when line level source is used.

Note: Monitor the sound being recorded by connecting an earphone to the AUDIO MONITOR jack and setting the AUDIO MONITOR CH1/CH2 switch to CH2.

10-4. SOUND MONITORING DURING RECORDING

Proceed as follows when monitoring the sound during recordings.

- (1) Connect an earphone to the AUDIO MONITOR jack.
- (2) Set the AUDIO MONITOR CH1/CH2 switch to the channel to be monitored.
- (3) Adjust the sound level using the AUDIO MONITOR LEVEL control. When rotated clockwise, the volume is increased; when rotated counterclockwise, it is reduced.

10-5. SMPTE TIME CODE GENERATOR

The SMPTE time code generator is a generator which allows numbers from 000000 up to 235959 to be recorded on the tape indicating 23 minutes, 59 seconds, and 59 frames. The time display can be reset to 000000 at any time. During any mode other than REC the TC display may go through 000000 again.

The actual Time Code generator advances the time code count up to 23 hr, 59 min, 59 sec, and 29 frames. After this the time code is again 000000.

Power supply

A dedicated nickel-cadmium battery powers the internal time code generator. When the VTR's power is cut off,

power is automatically supplied to the generator from this battery.

This battery is not coupled to the POWER switch.

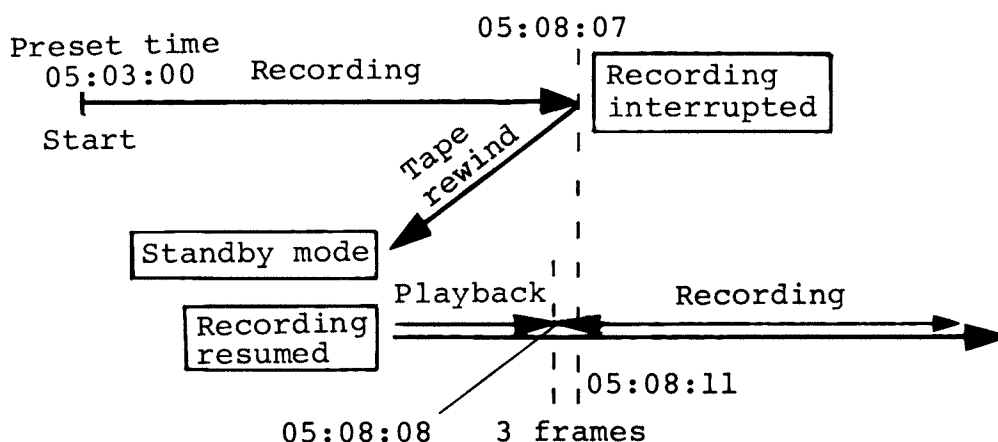
In fact, it is charged during the time when the AC adaptor is attached and turned ON a full charge the backup function is operational for a maximum of 4 days.

When the replacement battery is needed order one from Panasonic Parts Dept. Part No. is P-01-L4Pl.

RECORDING

The time code signal is recorded in the REC mode. It is not recorded on the tape when the auto back space mechanism has been activated or when any mode other than REC, such as rewind, fast forward, stop and standby has been established.

During auto back space operation the time code generator is stopped in standby mode and is resumed 3 frames before interruption location. The TC recorded is thus discontinuous by 3 frames at the place where recording is interrupted.

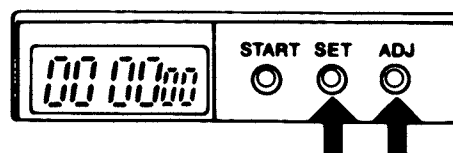


The time code generator display is disabled for up to a maximum of about 10 minutes when the battery or AC adaptor is re-attached after having been removed for a long period of time.

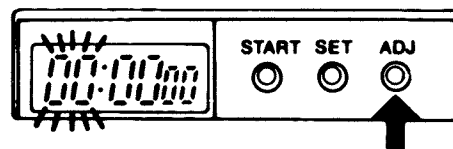
Irregular time code is recorded on the tape when the REW, FF or STOP function buttons are pressed but when the tape makes no contact with the video heads.

10-6. SETTING THE TIME CODE TIME

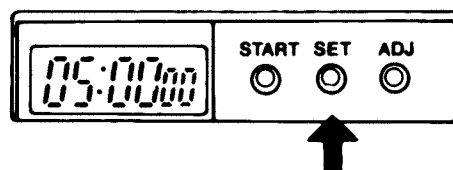
- (1) Press the ADJ and SET buttons simultaneously to reset the display to "000000".



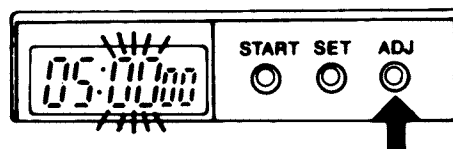
Press the ADJ button to make the counter "hour" display blink.



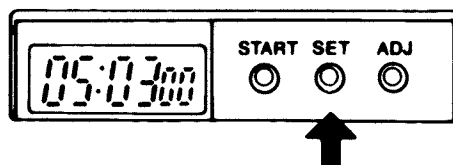
Press the SET button to set the hour. The hours can be set between 00 and 23.



To set the minutes press the ADJ button again to make the counter minute display blink.



Next, press the SET button to set the minutes. The minutes can be set between 00 and 59.



*When the SET button is kept down, the display is advanced rapidly.

When the ADJ button is pressed repeatedly, the hours and minutes blink alternately.

10-7. TIME START

When the time has been set, press the START button to start the time code generator.

Note: While the TC display is only in hours, minutes, seconds the actual Time Code recorded on tape

includes frames up 23 hours, 59 min., 59 sec.,
and 29 frames.

10-8. CONNECTION TO EXTERNAL SMPTE TIME CODE GENERATOR

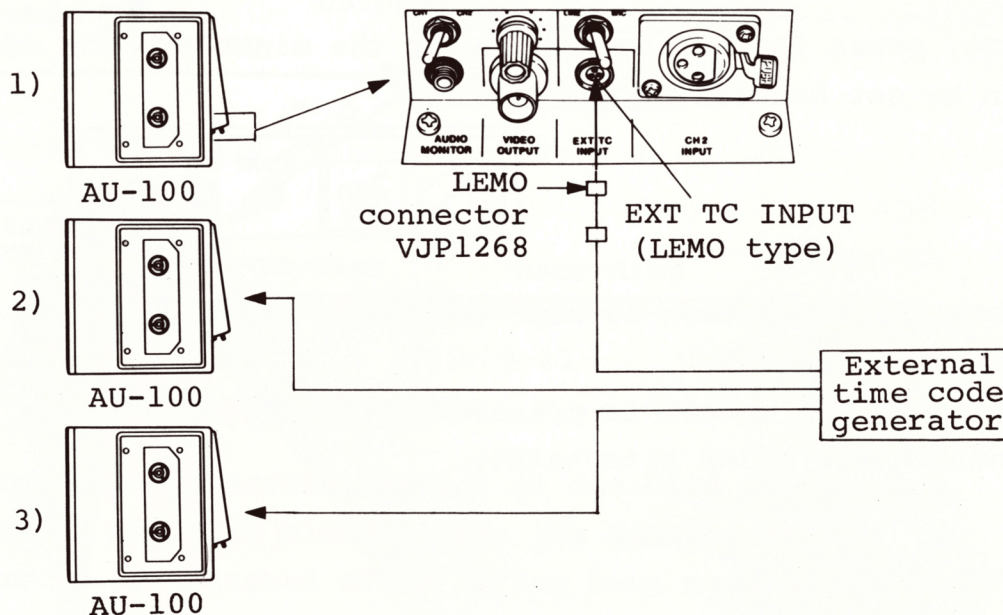
If an external SMPTE time code generator is used when recording with two or more video camera/VTRs and the tapes are to be edited by a controller, and when the recording is performed simultaneously, the same pictures can be located by finding the same time code.

This is useful in post-production work.

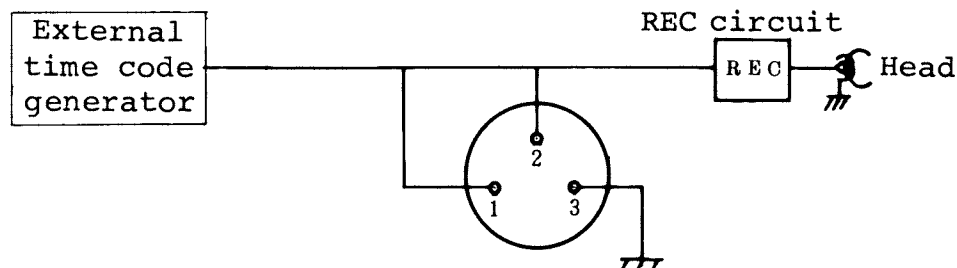
Connect the generator to the rear panel EXT TC INPUT terminal.

The generator's time code circuit in the VTR switches automatically to the external generator signal. Use the optional accessory LEMO connector for the time code generator input. The TC display on the VTR with still display the internally generated time code and should be ignored.

For details on the time code adjustment, refer to the Instruction Manual accompanying the time code generator being used.



The circuit shown below is set up when the LEMO connector (optional accessory VJP1268) is connected to the EXT TC INPUT connector.



11. SET-UP AND TROUBLESHOOTING

11-1. WARNING LEDS

When the AU-100 VTR and AK-100 camera are used in a system, the VTR warning LED (and remaining tape LEDs) inside the camera's viewfinder light or blink to indicate the source of malfunction.

(1) TAPE SLACK LED

This LED lights when the tape slack occurs or when there is a problem with the tape transport during recording. It also lights when the reel stops rotating for more than 0.5 sec. or when the cylinder motor is locked.

In this case tape is unloaded and the unit is set to the STOP mode.

(2) END LED

This LED blinks when less than 1 minute of tape remains for recording.

The END LED lights when the tape-end is detected in the recording or fast forward mode and the AU-100 is set to the STOP mode.

(3) SERVO LED

This LED lights when the cylinder servo or capstan servo is unlocked. If recording is continued in this state, the pictures may not be vertically locked.

(4) DEW LED

This LED lights when dew has formed inside the AU-100.

Mode control matrix

LED	Diaplay	Trouble	AU-100 operation
SLACK	Lights	1) Tape stops running in recording mode. 2) Incorrect mode switching. 3) Cylinder and reel stop rotating.	Unit is set to the STOP mode.
END	Blinks	Less than 1 min. of tape remaining	Recording continues.
	Lights	Tape comes to end in recording fast forward modes.	Unit is set to STOP mode.
SERVO	Lights	Irregular sync	Recording continues.
DEW	Lights	Dew formation	Recording disabled.

Mode control matrix after warning LED is lit.

O: When a function button is pressed, the unit is set to the corresponding mode.

x: The unit cannot be set to the desired mode even when the function button is depressed.

Note: The tape is loaded but the unit is set to the STOP mode when a malfunction persists.

Function button LED		EJECT	REW	STOP	FF	REC ON	REC OFF
SLACK (lighted)		○ Tape may become stuck.	○ Unit may not work or tape may be damaged.	Auto stop	○ Unit may not work or tape may be damaged.	○ See Note	○
END	Blinks	○	○	○	○	○	○
	Lit	○	○	Auto stop	x	x	○
SERVO (lit)		○	○	○	○	○ Recording cannot be guaranteed.	○
DEW (lit)		○	○ Tape and heads may be damaged.	○	○ Tape and heads may be damaged.		

* The AU-100 is set to the STOP mode when the SLACK LED lights during recording. In this case, first press the camera's VTR start/stop switch and then set the AU-100 to the REC OFF mode. Next, when the desired function button is pressed, the SLACK LED should go OFF and the unit be set to the desired mode.

Continued on next page.

- * When the DEW LED lights to indicate that dew has formed inside the AU-100, remove the cassette tape. Wait for the DEW LED to go OFF in the STOP mode (with the POWER switch in the CAM + VTR position). Even when the DEW LED is OFF, run the tape and check that there is no malfunction. Observe caution when SLACK LED is lit.
- * When the SLACK LED is lit, make sure that the camera's VTR start/stop switch is pressed to set the unit in the REC OFF mode before transferring the unit to the next mode.

11-2 FUNCTION BUTTONS

The following table shows the function button and mode correlation. "0" indicates that the AU-100 is transferred to the desired mode but "X" indicates that this may not happen.

Desired mode Current mode	EJECT	REW	STOP	FF	REC ON	REC OFF	MANUAL EJECT
Cassette out		x	x	x	x	x	o
Tape rewind	x		o	o	o	x	o
Stop	o	o		o	o (Note 1)	x	o
Tape fast forward	x	o	o		x	o	o
Recording	x	x	x	x		o	o
Auto back-space	x	x	x	x	o (Note 2)	o	o
Standby	x	x	o	x	o		o
Tape loading	x	x	x	x	o		o
Tape unloading	x	x	x	x	o		o

Note 1: The unit will not be set to the REC mode even if the VTR start/stop switch is pushed when the tape has stopped upon detection of the tape-end and the modes switched to rewind from the tape-end.

Only the EJECT mode is operational in this case.

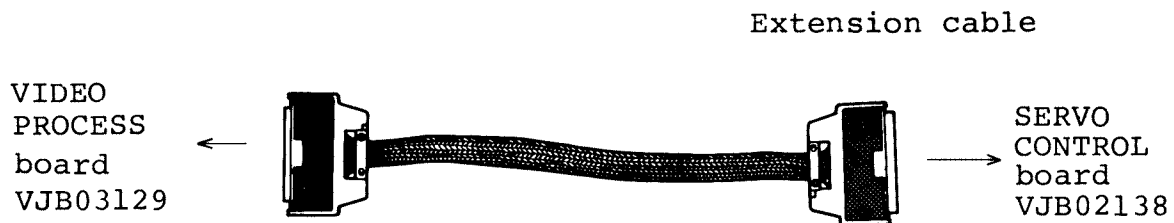
Note 2: The REC mode is established after the auto back space operation.

12. STANDARD ACCESSORIES

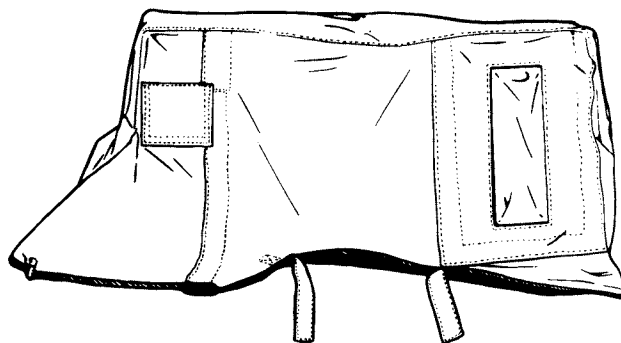
The accessories supplied with the AU-100 are listed below.

12-1. EXTENSION CABLE (VFK0219)

This is used when adjusting the VIDEO PROCESS board VJB03129 (excluding REC currents) inside the AU-100.



12-2. RAIN COVER (VFB0040)



13. OPTIONAL ACCESSORIES

The following optional accessories for the AU-100 are available.

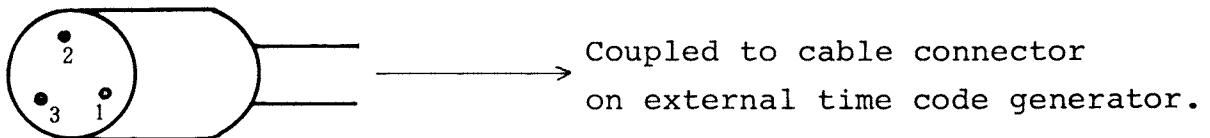
13-1. NTSC ADAPTOR (AU-S100)

This is used when a system is composed using the AU-100 VTR and any NTSC composite signal type of video camera. The NTSC adaptor converts the NTSC video signal into the Y signal and I/Q signals.

For further details, refer to the Instruction Manual of the AU-S100.

13-2. LEMO TYPE CONNECTOR (VJP1268)

This is used for coupling EXT TC GENERATOR OUTPUT connector to the VTR. Connection should be made to the output connector on the external time code generator. EXT TC INPUT pins 1 and 3 are shorted when an external generator is connected.



- 1. GND
- 2. HOT
- 3. COLD

PANASONIC INDUSTRIAL COMPANY

Division of Matsushita Electric Corporation of America

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Audio-Video Systems Division Executive Office/One Panasonic Way, Secaucus, New Jersey 07094 (201) 348-7000

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IMPORTANT NOTICE

The Technical Description portion of the RECAM model AU-100 the Service Manual is now in preparation. In order to make service information available as rapidly as possible, this Service Manual has been shipped without Technical Description.

To insure future receipt of the Technical Description, please fill out the lower portion of this page which will become the address label. Please print or type.

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Service Manual

RECAM™

Electrical Adjustment

Portable VTR AU-100



SPECIFICATIONS

General

Power Source: 12V DC
 Power Consumption: 12W
 Recording System: 4 rotary heads, helical scanning, separate Y/C track system
 Tape Run Mechanism: M-format (1/2" tape)
 Tape Speed: 204.5 mm/s
 Tape: NV-T120 HG tape
 Recording Time: 20 minutes (NV-T120 HG tape)
 FF/REW Time: Less than 5 minutes (NV-T120 HG tape)
 Weight: Approx. 9.02 lbs. (4.1 kg)
 Dimensions: 4-3/4"(W) × 9-3/8"(H) × 10"(D)
 120(W) × 237(H) × 253(D) mm

Video

Television System: NTSC system, 525 lines, 60 fields
 Modulation System: Frequency modulation for luminance signal
 Frequency modulation multiplexing for chrominance signal (I/Q)
 Bandwidth: 3.8 MHz for luminance
 1.0 MHz for chrominance
 Inputs: Y: 1.0 Vp-p (75% color bar), 75Ω unbalanced
 I: 0.714 Vp-p, 75Ω unbalanced
 Q: 0.714 Vp-p, 75Ω unbalanced
 NTSC composite video, 1.0 Vp-p, 75Ω
 Outputs:

Audio

Frequency response: 50 ~ 15,000 Hz ±3 dB
 Inputs: MIC: -60 dBm, 600Ω balanced } switch
 LINE: +4 dBm, 600Ω balanced } selectabl
 Output: EARPHONE, -20 dB ~ -32 dB (variable), 8Ω unbalanced
 External Time Code: Input; 2.5 Vp-p, 600Ω unbalanced
 Ambient Temperature: Operating: 32°F ~ 104°F (68°F reference temperature)
 Storage: -4°F ~ 140°F
 Ambient Humidity: 20% ~ 85% (50% reference humidity)

Weight and dimensions shown are approximate.
 Specifications are subject to change without notice.



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1. TEST EQUIPMENT

To perform all the electrical adjustments, the following equipment is required.

1. DVM (DIGITAL VOLT METER)
Voltage Range: 0.001-50V
2. DUAL-TRACE OSCILLOSCOPE
Voltage Range: 0.005-50V/Div
Frequency Range: DC-50MHz
Probes: 10:1, 1:1
3. FREQUENCY COUNTER
Frequency Range: DC-10MHz
4. SIGNAL GENERATOR
Sinewave: 0-10MHz
5. VIDEO SWEEP GENERATOR
6. SPECTRUM ANALYZER
7. VTVM (VACUUM TUBE VOLT METER)
Voltage Range: 0.001-50V
8. DC POWER SUPPLY
9. DIAL TORQUE GAUGE
Adaptor
10. ALIGNMENT TAPE
11. EXTENSION CABLE
12. PLASTIC TIP DRIVER

2. ADJUSTMENT PROCEDURES

The following adjustment procedures are provided.

- 2-1. DISASSEMBLY METHOD
- 2-2. POWER SUPPLY SECTION
(SERVO SYSTEM CONTROL P.C.B.) (P-2)
- 2-3. SYSTEM CONTROL SECTION
(SERVO SYSTEM CONTROL P.C.B.) (P-2)
- 2-4. SERVO SECTION
(SERVO SYSTEM CONTROL P.C.B.) (P-2)
- 2-5. VIDEO SECTION
(VIDEO PROCESSOR P.C.B.) (P-1)
- 2-6. AUDIO SECTION
(AUDIO PROCESSOR P.C.B.) (P-3)
- 2-7. TIME CODE GENERATOR SECTION
(TIME CODE GENERATOR P.C.B.) (P-4)

2-2. POWER SUPPLY ADJUSTMENT (SERVO SYSTEM CONTROL P.C.B.) (P-2)

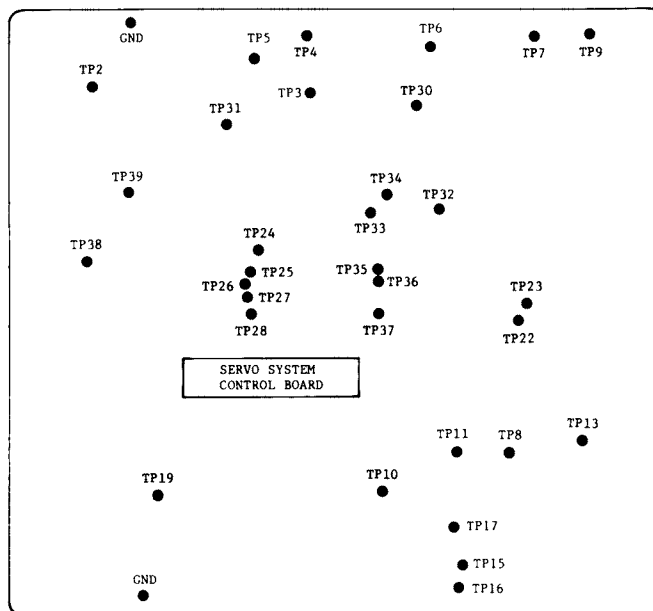


Fig. 2-2-1. SERVO SYSTEM CONTROL TEST POINT LOCATION

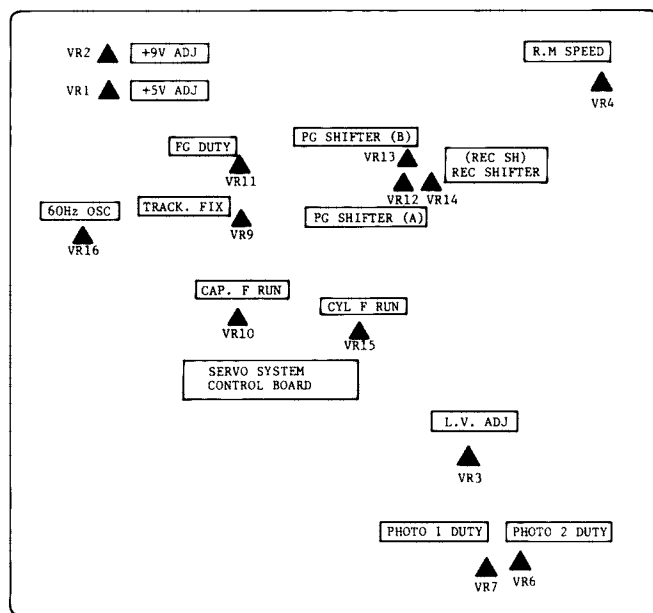


Fig. 2-2-2. SERVO SYSTEM CONTROL P.C.B CONTROL LOCATION

2-2-1. VOLTAGE ADJUSTMENT

Test Points: TP3, TP5, TP6

Adjustments: VR1 (+9V ADJ)

VR2 (+5V ADJ)

1. Confirm that the battery voltage is between 10-16V DC, then turn power switch ON.
2. Insert a cassette and make a recording.
3. Connect the DVM to TP3 (+) and GND (-).
4. Adjust VR1 (+9V ADJ) to 9.0V DC $\pm$ 0.2V DC.
5. Connect the DVM to TP5 (+) and GND (-).
6. Adjust VR2 (+5V ADJ) to 5.0V DC $\pm$ 0.2V DC.
7. Connect the DVM to TP6 (+) and GND (-).
8. Confirm that the voltage is -6.3V DC $\pm$ 0.4V DC.

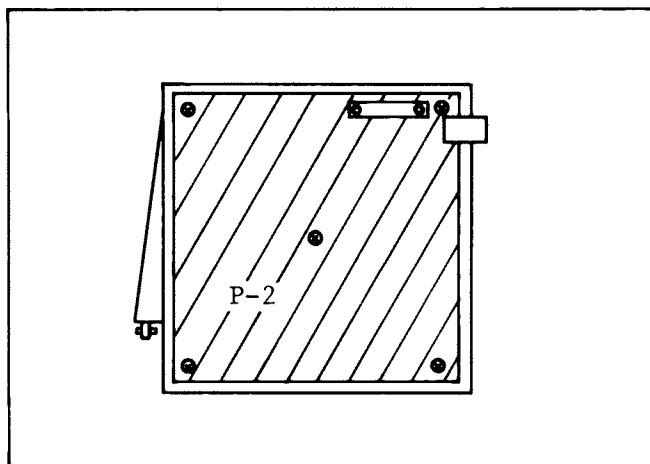


Fig. 2-2-3. VOLTAGE ADJUSTMENT CONDITION

2-3. SYSTEM CONTROL SECTION (SERVO SYSTEM CONTROL P.C.B.)

2-3-1. REEL ENCODER ADJUSTMENT

Test Points: TP15, TP16, TP17

Adjustments: VR6 (PHOTO 2 DUTY)

VR7 (PHOTO 1 DUTY)

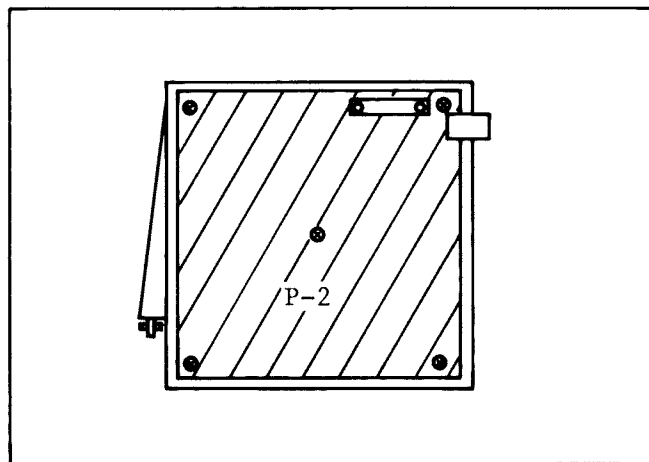


Fig. 2-3-1. SYSTEM CONTROL
ADJUSTMENT CONDITION

1. Turn the power switch ON.
2. Insert a cassette and make a recording.
3. Connect scope CH1 to TP15 and CH2 to TP16. Set the scope in CHOP mode.
4. Adjust VR6 (PHOTO 2 DUTY) and VR7 (PHOTO 1 DUTY) as shown in Fig. 2-3-2.
5. Connect the scope to TP17 and confirm that the voltage in FF mode is approx. 0V DC and that the voltage in REW mode approx. 5V DC.

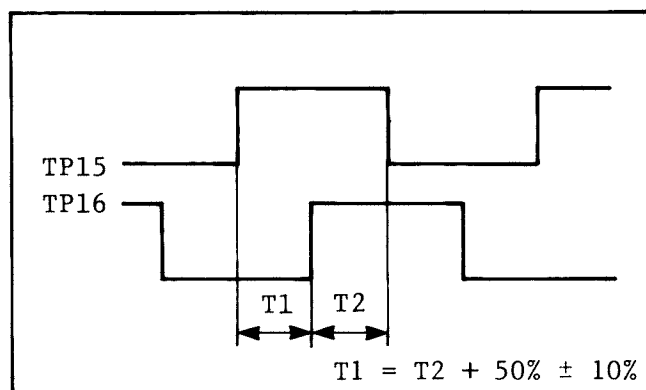


Fig. 2-3-2. REEL ENCODER

2-3-2. REEL MOTOR VOLTAGE ADJUSTMENT

Test Point: TAKE UP REEL

Adjustment: VR4 (RM SPEED)

1. Turn the power and the color bar switches ON.
2. Insert the tension adjustment cassette.

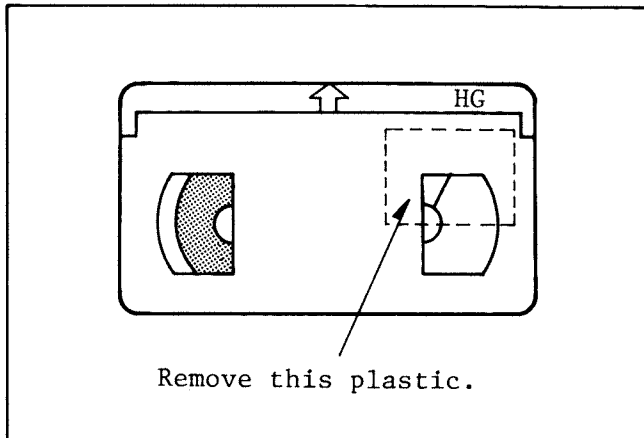


Fig. 2-3-3. HOW TO MODIFY

3. Record the cassette tape from its beginning and wait until tape running has stabilized.
4. Insert the tension meter in the cassette like Fig. 2-3-4.

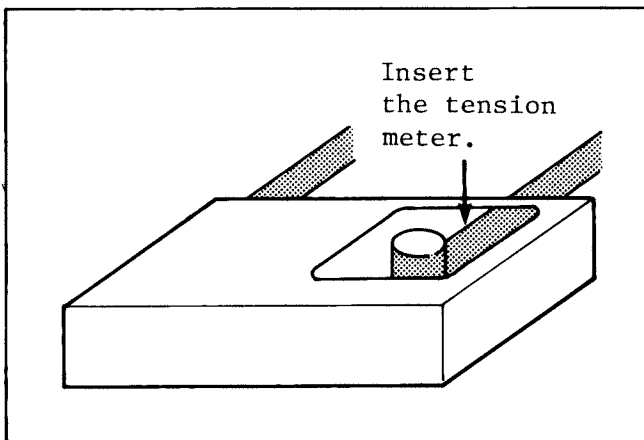


Fig. 2-3-4. REEL MOTOR VOLTAGE ADJUSTMENT

5. Adjust VR4 so that the tension is $80\text{g-cm} \pm 10\text{g-cm}$.

2-3-3. LOW VOLTAGE DETECTOR ADJUSTMENT

Test Point: TP8

Adjustment: VR8 (LOW VOLT ADJ)

1. Connect the DC Power Supply instead of Battery.
2. Turn the power switch ON.
3. Insert a cassette and make a recording.
4. Turn VR8 (LOW VOLT ADJ) clockwise.
5. Then decrease the voltage of Power Supply to 8V.
6. Adjust VR8 (LOW VOLT ADJ) so that TP8 is LOW.
7. Then confirm that the detection voltage is $8\text{V DC} \pm 0.1\text{V DC}$.

2-4. SERVO ADJUSTMENT (SERVO SYSTEM CONTROL P.C.B.)

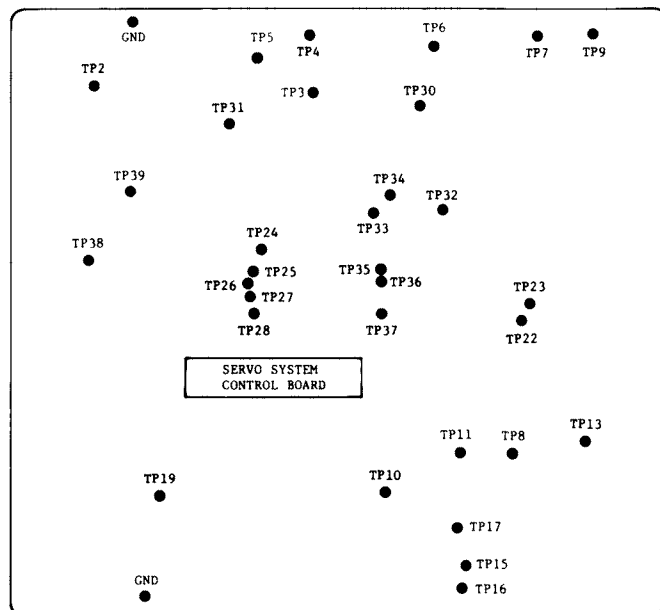


Fig. 2-4-1. SERVO SYSTEM CONTROL TEST POINT LOCATION

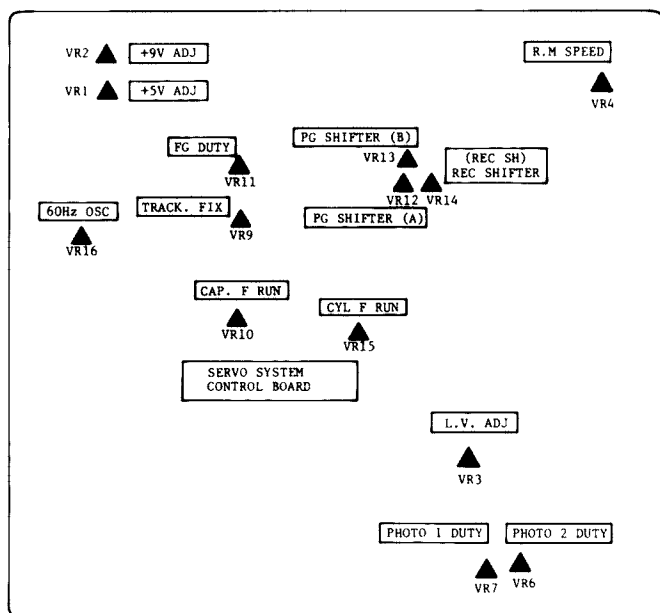


Fig. 2-4-2. SERVO SYSTEM CONTROL P.C.B CONTROL LOCATION

2-4-1. BUFFER OSC FREQUENCY ADJUSTMENT

Test Point: TP38

Adjustment: VR16 (60Hz OSC)

1. Connect the FREQUENCY COUNTER to TP38.
2. Connect a jumper wire between the base and the emitter on Q71 on the SERVO/SYSTEM CONTROL P.C.B.

3. Turn the power switch ON.
4. Adjust VR16 (60Hz OSC) to $57.0\text{Hz} \pm 0.5\text{Hz}$.
5. Remove the jumper wire.
6. Confirm that the frequency at TP38 is 59.9Hz.

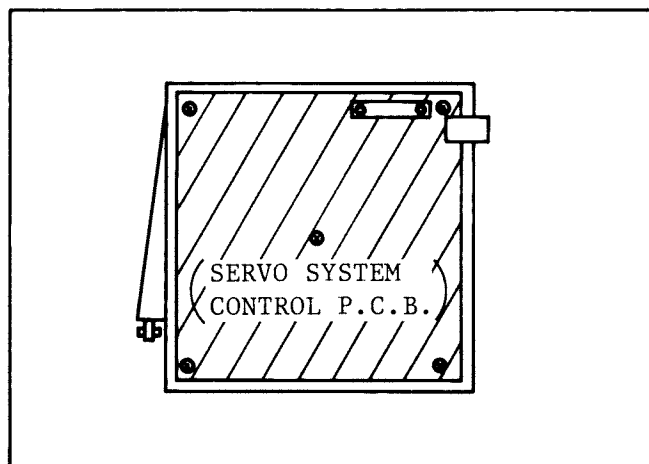


Fig. 2-4-3. SERVO ADJUSTMENT CONDITION

2-4-2. DRUM FREE RUN ADJUSTMENT

Test Points: TP35 TP36, TP37

Adjustment: VR15 (CYL F RUN)

1. Turn the power and color bar switches ON.
2. Insert a cassette and make a recording.
3. Connect scope CH1 to TP36 and CH2 to TP35. Set the scope in CHOP mode.
4. Adjust VR15 (CYL F RUN) so that the two waveforms are locked, as shown in Fig. 2-4-4.
5. Connect the DVM to TP37 (+) and GND (-).
6. Readjust VR15 (CYL F RUN) to $3.7\text{V} \pm 0.3\text{V}$. Confirm that the two waveforms are locked.

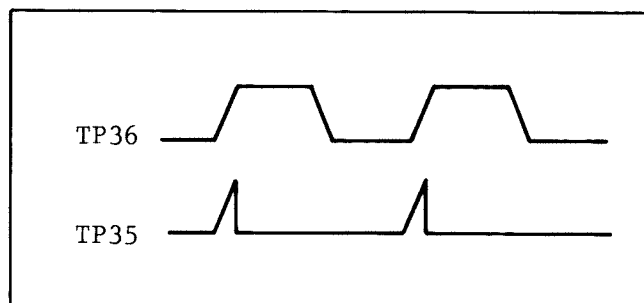


Fig. 2-4-4. DRUM FREE RUN

2-4.3. FG DUTY ADJUSTMENT

Test Point: TP31

Adjustment: VR11 (FG DUTY)

1. Turn the power switch ON.
2. Insert a cassette and make a recording.
3. Connect the scope to TP31.
4. Adjust VR11 (FG DUTY) as shown in Fig. 2-4-5.

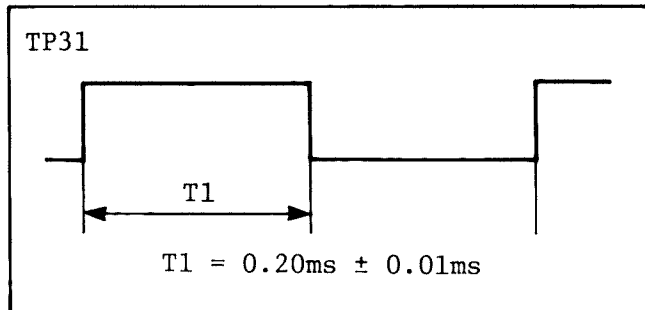


Fig. 2-4-5. FG DUTY

2-4.4. CAPSTAN FREE RUN ADJUSTMENT

Test Points: TP26, TP27, TP28

Adjustment: VR10 (CAP F RUN)

1. Turn the power switch ON.
2. Insert a cassette and make a recording.
3. Connect scope CH1 to TP26 and CH2 to TP27. Set the scope in CHOP mode.
4. Adjust VR10 (CAP F RUN) so that the two waveforms are locked, as shown in Fig. 2-4-6.
5. Connect the DVM to TP28 (+) and GND (-).
6. Readjust VR10 (CAP F RUN) to $3.6\text{V} \pm 0.3\text{V}$. Confirm that the two waveforms are locked.

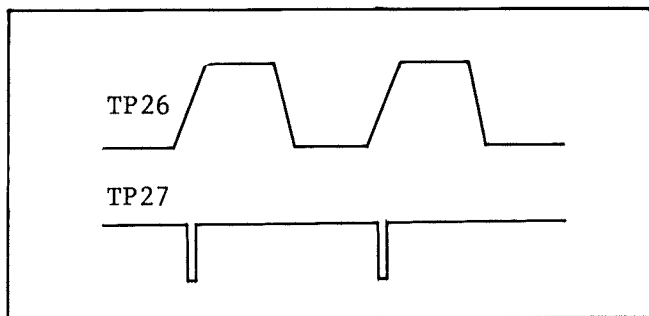


Fig. 2-4-6 CAPSTAN FREE RUN

2-4.5. PG SHIFTER ADJUSTMENT (USE STUDIO VTR)

Test Points: TP11 of LUMINANCE PLAYBACK
P.C.B. STUDIO VTR

Adjustments: VR12 (PG SHIFTER A)
VR13 (PG SHIFTER B)

1. Remove the P53 and the P54 of the HEAD AMPLIFIER P.C.B. (STUDIO VTR).
2. Connect the HEAD CONNECTOR to the HEAD AMPLIFIER P.C.B. (STUDIO VTR) by the HEAD AMP CONNECTOR, C OUTPUT to P54 and Y OUTPUT to P53.

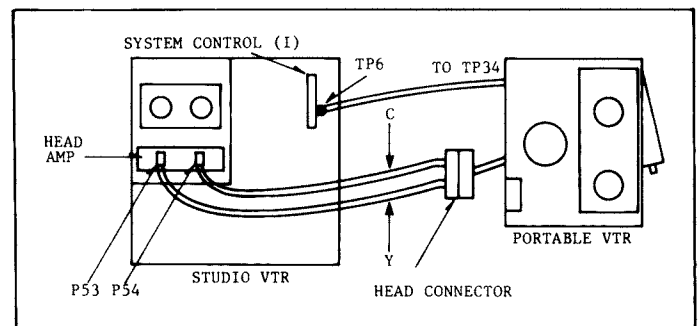


Fig. 2-4-7. PG SHIFTER CONNECTION

3. Connect a jumper wire between GND and TP6 on the SERVO SYSTEM CONTROL P.C.B. (PORTABLE VTR).
4. Connect a jumper between TP6 on the SYSTEM CONTROL (I) P.C.B. (STUDIO VTR) and TP34 on the SERVO SYSTEM CONTROL P.C.B. (PORTABLE VTR).
5. Connect a jumper wire between B-15 and TP5 (PORTABLE VTR) to simulate Playback mode.
(If this section is connected, the SERVO SECTION is placed Playback mode.)
6. Turn the power switch ON of PORTABLE VTR and insert the alignment tape and make a recording.
7. Turn the power of STUDIO VTR ON and insert the cassette tape and place the unit in Playback mode.
8. Connect scope CH1 to TP11 on the LUMINANCE PLAYBACK P.C.B. (STUDIO VTR) and connect CH2 to TP34 on the SERVO SYSTEM CONTROL P.C.B. (PORTABLE VTR). Set scope in CHOP mode.
9. Expand the falling edge of the switching pulse.

10. Adjust VR12 (PG SHIFTER A) so that the falling edge of the switching pulse is $3.25H \pm 0.5H$ before the start of the vertical sync, as shown in Fig. 2-4-8.

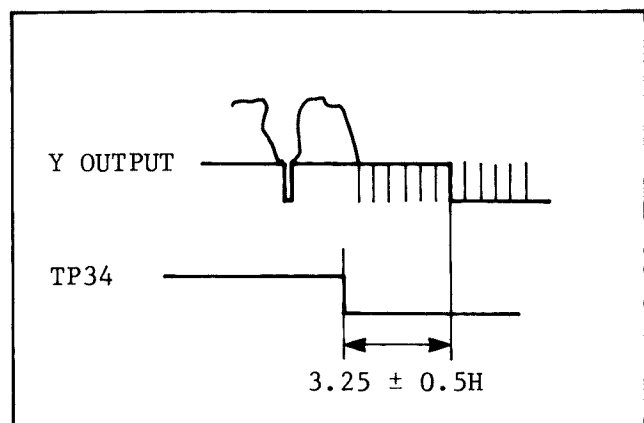


Fig. 2-4-8: PG SHIFTER A

11. Expand rising edge of the switching pulse.
12. Adjust VR13 (PG SHIFTER B) so that the rising edge of the switching pulse is $3.25H \pm 0.5H$ before the start of the vertical sync, as shown in Fig. 2-4-9.

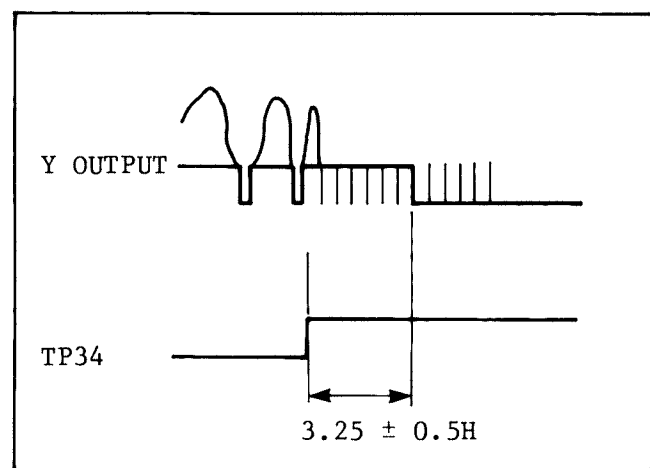


Fig. 2-4-9. PG SHIFTER B

13. Switch the slope selector on the scope to either + (plus) or - (minus) then adjust VR13 (PG SHIFTER B) so that the difference between the rising and falling edges of the switching pulse is less than $6\mu\text{sec}$ as shown in Fig. 2-4-10.

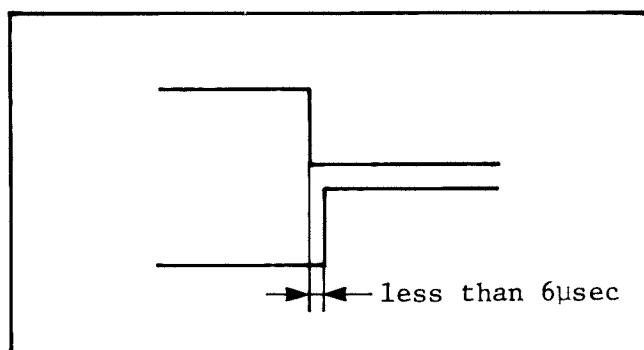


Fig. 2-4-10. PG SHIFTER

2-46. RECORDING SHIFTER ADJUSTMENT

Test Points: TP34, TP39

Adjustment: VR14 (REC SHIFTER)

1. Turn the power switch ON.
2. Connect scope CH1 to TP39 and CH2 to TP34. Set scope in CHOP mode.
3. Insert a cassette and make a recording.
4. Expand the falling edge of the switching pulse.
5. Adjust VR14 (REC SHIFTER) so that the falling edge of the switching pulse is $3.25H \pm 0.5H$ before the start of the vertical sync, as shown in Fig. 2-4-11.

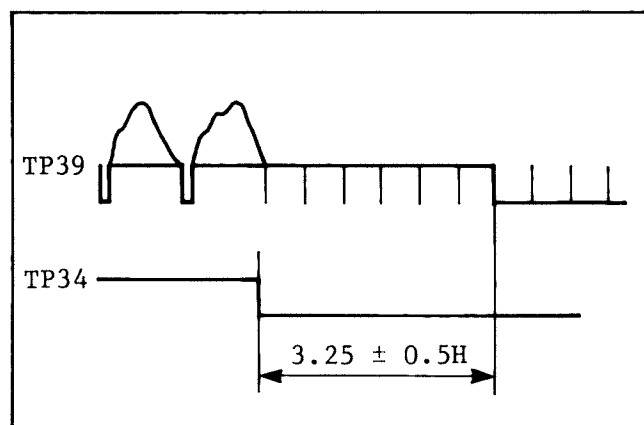


Fig. 2-4-11. REC SHIFTER

2-4-7. TRACKING FIX ADJUSTMENT (USE STUDIO VTR)

Test Points: TP34 on the SERVO SYSTEM
CONTROL (PORTABLE VTR)
TP2 on the CHROMINANCE
PLAYBACK (P.C.B.)

Adjustment: VR9

1. Turn the power and color bar switches ON.
2. Insert a cassette and make a recording for a few minutes.
3. Rewind the just-recorded portion of the tape.
4. Remove P53 and P54 of the HEAD AMPLIFIER P.C.B. (STUDIO VTR).
5. Connect the HEAD CONNECTOR to the HEAD AMPLIFIER P.C.B. (STUDIO VTR) by the HEAD AMP CONNECTOR, C OUTPUT to P54 and Y OUTPUT to P53.
6. Connect a jumper wire between GND and TP6 on the DRUM SERVO P.C.B. (STUDIO VTR).
7. Connect a jumper between TP6 on the SYSTEM CONTROL (1) P.C.B. (STUDIO VTR) and TP34 on the SERVO SYSTEM CONTROL P.C.B. (PORTABLE VTR).
8. Connect a jumper wire between B-15 and TP5 to simulate the condition is Playback mode.
9. Turn the power switch of STUDIO VTR ON, insert the cassette tape and place the unit of Playback mode.
10. Connect the scope CH1 to TP2 on the CHROMINANCE PLAYBACK P.C.B. (STUDIO VTR) and connect CH2 to TP34. Set the scope in CHOP mode.
11. Adjust the VR9 so that the C OUTPUT CH1 is maximum.

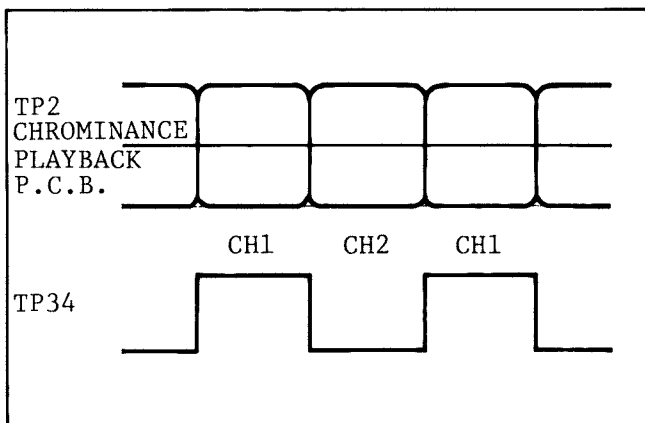


Fig. 2-4-12. TRACKING FIX ADJUSTMENT

2-5. VIDEO SECTION (P-1)

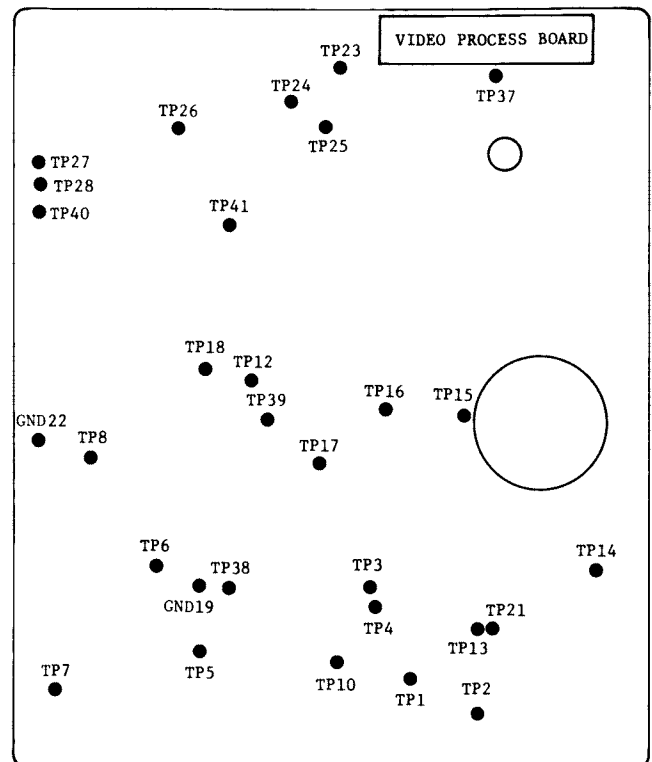


Fig. 2-5-1. VIDEO PROCESSOR
TEST POINT LOCATION

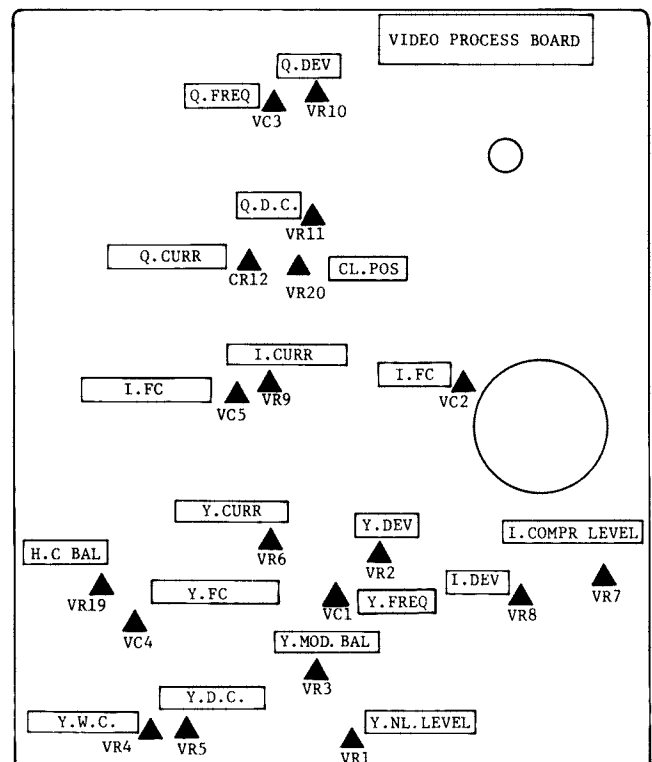


Fig. 2-5-2. VIDEO PROCESSOR
CONTROL LOCATION

1. Turn the power switch OFF.
2. Remove the screw (A) and pull out the 4 plastic rivets (A), as shown in Fig. 2-5-3.
3. Remove the SERVO SYSTEM CONTROL C.B.A. (P-2).
4. Remove the 2 screws (B) and the 2 plastic rivets (B). Remove the shield plate.
5. Connect extension cable between the SERVO SYSTEM CONTROL C.B.A. (P-2)

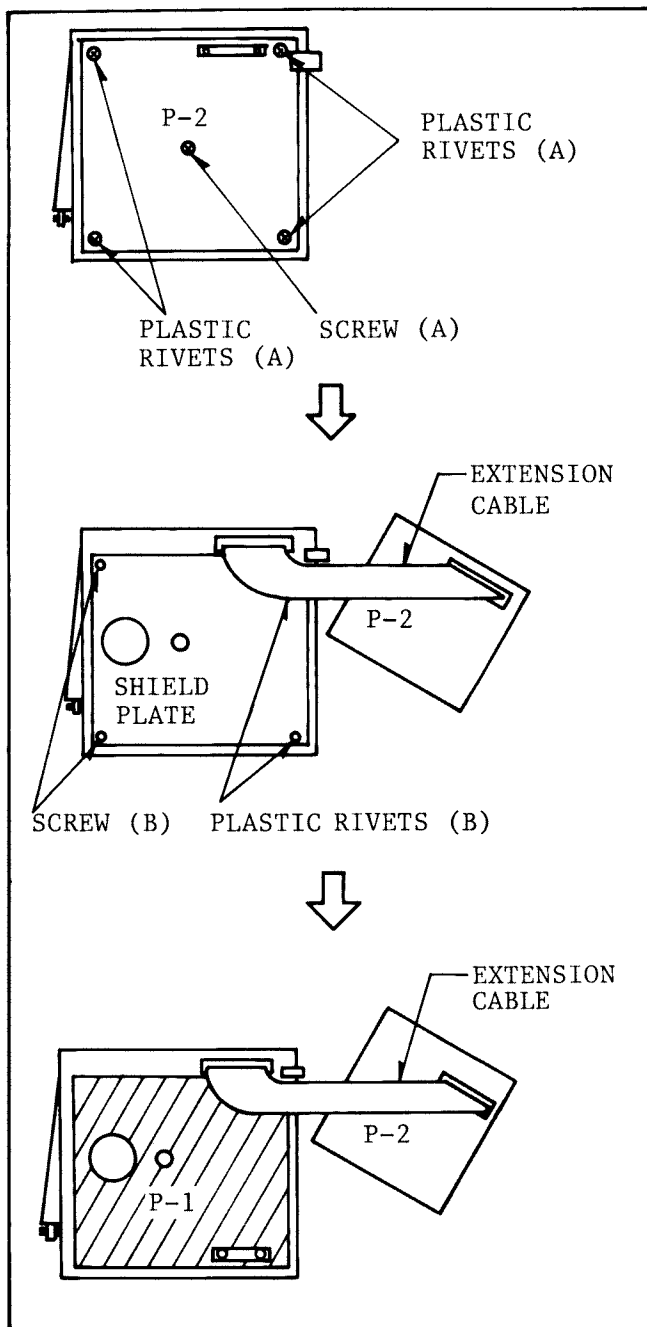


Fig. 2-5-3. VIDEO ADJUSTMENT CONDITION

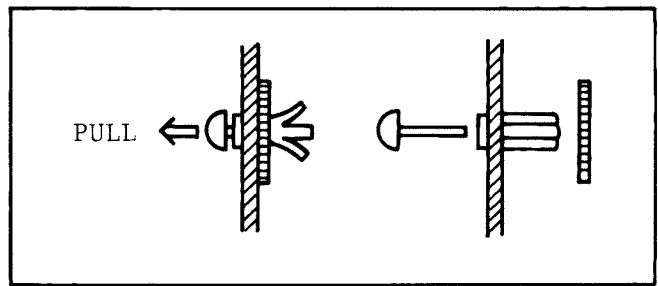


Fig. 2-5-4. REMOVAL OF PLASTIC RIVET

2-5-1. Y NON LINEAR EMPHASIS INPUT LEVEL ADJUSTMENT

Test Point: TP3

Adjustments: VR1 (Y NL LEVEL)

1. Turn the power and the color bar switches ON.
2. Connect the scope to TP3.
3. Adjust VR1 (Y NL LEVEL) to $2.4V_{p-p} \pm 0.05V_{p-p}$, as shown in Fig. 2-5-5.

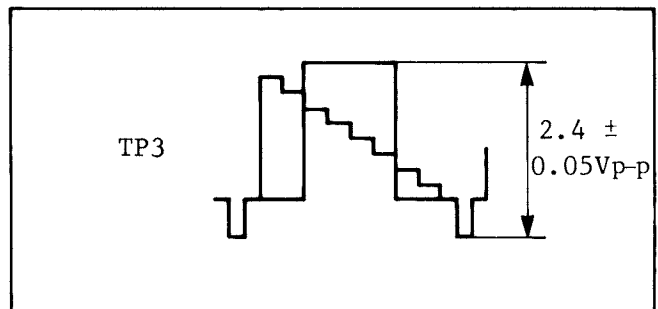


Fig. 2-5-5. Y NON LINEAR LEVEL

2-5-2-A. Y DEVIATION & CARRIER BALANCE (USE STUDIO VTR)

Test Point: TP11 on the LUMINANCE
PLAYBACK P.C.B.
on the STUDIO VTR

Adjustments: VR3 (Y MOD BAL)
VR2 (Y DEV)
VC1 (Y FREQ)

1. Remove the VIDEO PROCESSOR P.C.B. Connect extension cable SERVO SYSTEM CONTROL between VIDEO PROCESS and connector in the unit.
2. Remove the YIQ RECORDING P.C.B. (STUDIO VTR).
3. Connect Y-EE IN (A.B-18) on the LUMINANCE PLAYBACK P.C.B. to EE OUTPUT (P30) on the VIDEO PROCESSOR P.C.B. (P-1).
4. Connect the signal generator to Y-EE IN (A.B-18) on the LUMINANCE PLAYBACK P.C.B.
5. Connect scope to TP11 on the LUMINANCE PLAYBACK P.C.B. (STUDIO VTR).
6. Turn the power and the color bar switches ON.
7. Adjust VC1 (Y FREQ) and VR2 (Y DEV) so that the sync tip frequency is $4.3\text{MHz} \pm 0.05\text{MHz}$, white peak frequency is $5.9\text{MHz} \pm 0.05\text{MHz}$ and the deviation is $1.6\text{MHz} \pm 0.03\text{MHz}$, as shown in Fig. 2-5-6.

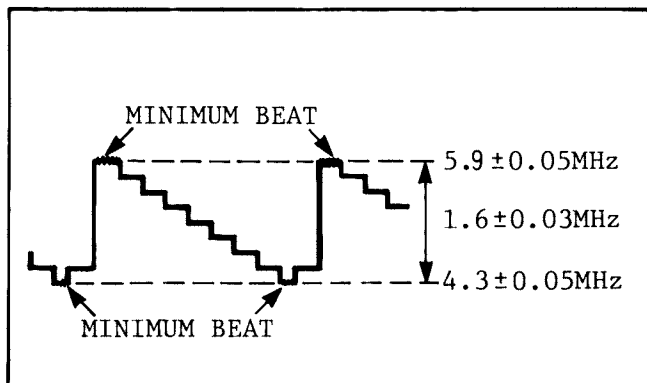


Fig. 2-5-6. Y. DEVIATION

8. Connect a jumper wire between TP2 and GND near TP2. Connect the spectrum analyzer to TP7.
9. Adjust VR3 (Y MOD BAL) so that the 2nd harmonic carrier level is minimized.

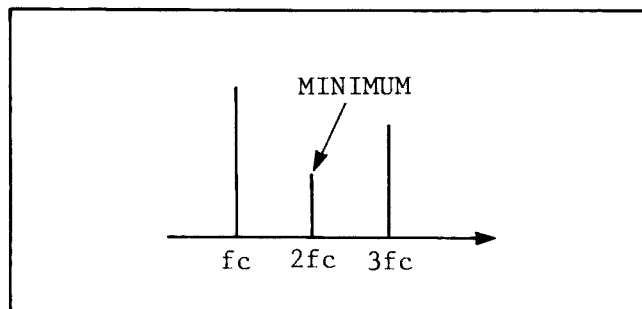


Fig. 2-5-7. CARRIER BALANCE

Note:

If a spectrum analyzer is not available, adjust for minimum distortion in the H sync portion.

2-5-3. Y WHITE & DARK CLIP

Test Point: TP5

Adjustments: VR4 (Y WC)
VR5 (Y DC)

1. Turn the power and the color bar switches ON.
2. Connect the scope to TP5.
3. Adjust VR4 (Y WC) so that $V1 = 190 \pm 5\%$, as shown in Fig. 2-5-8.
4. Adjust VR5 (Y DC) so that $V2 = 145 \pm 5\%$, as shown in Fig. 2-5-8.

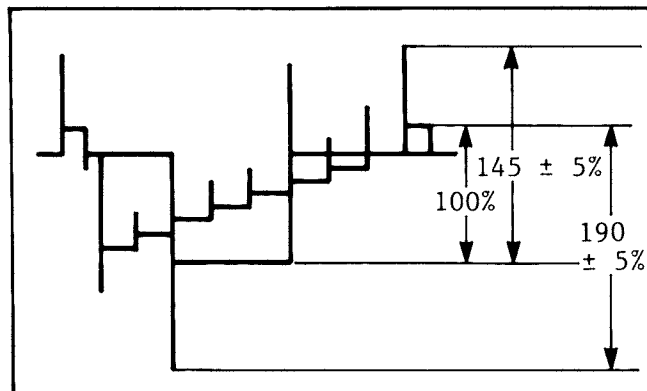


Fig. 2-5-8. Y. WHITE & DARK CLIP

2-5-4. Y RECORDING AMP FREQUENCY CHARACTERISTIC ADJUSTMENT

Test Point: TP5 on the
HEAD CONNECTION C.B.A.

Adjustment: VC4 (Y FC)

1. Turn VR6 (Y CURR) clockwise.
2. Turn the power switch ON.
3. Connect the scope to TP5.

4. Connect the sweep generator to TP38 (+) and TP19 (GND). Adjust the level of the sweep generator to 160mV at 4.5MHz at TP5.
5. Adjust VC4 (Y FC) as shown in Fig. 2-5-9.
6. Remove the sweep generator.

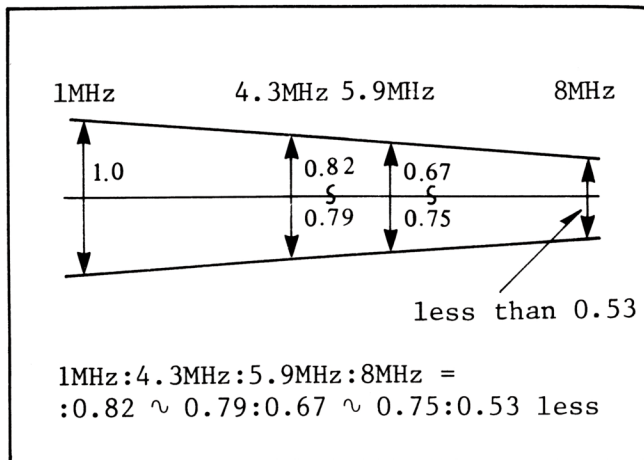


Fig. 2-5-9. Y. REC AMP FREQUENCY CHARACTERISTIC

2-5-5. Y RECORDING CURRENT ADJUSTMENT (USE STUDIO VTR)

Test Points: TP5, TP6 on the HEAD CONNECTOR C.B.A., as shown in Fig. 2-4-10.

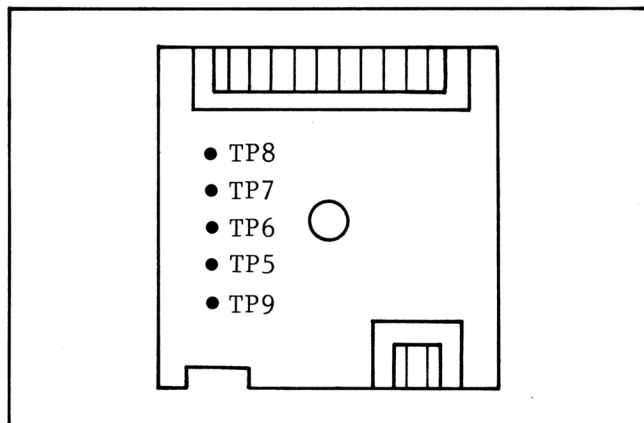


Fig. 2-5-10. HEAD CONNECTION P.C.B.

Adjustment: VR6 (Y CURR)

1. Turn VR6 (Y CURR) clockwise.
2. Turn the power switch ON and connect the signal generator to TP38.
3. Adjust the frequency of the signal generator to 5.33MHz.
4. Connect the scope to TP5 on the HEAD CONNECTION C.B.A.
5. Insert a cassette, then adjust the level of the signal generator successively to 100mV, 120mV, 140mV,

160mV, 180mV and 200mV, and make a recording at each signal generator level.

6. Remove P53 and P54 of the HEAD AMPLIFIER P.C.B. (STUDIO VTR).
7. Connect the VTR to the HEAD AMPLIFIER P.C.B. (STUDIO VTR) by the HEAD AMP CONNECTOR, C OUTPUT to P54 and Y OUTPUT to P53.

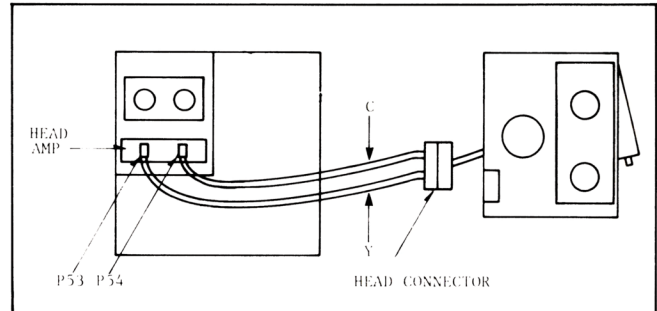


Fig. 2-5-11. Y RECORDING CURRENT CONNECTION

8. Connect a jumper wire between GND and TP6 on the DRUM SERVO P.C.B. (STUDIO VTR).
9. Connect a jumper wire between TP6 on the SYSTEM CONTROL (I) P.C.B. (STUDIO VTR) and TP34 on the SERVO SYSTEM CONTROL P.C.B. (PORTABLE VTR).
10. Connect jumper wire between B-15 and TP5 on the SERVO SYSTEM CONTROL P.C.B. (P-2) to simulate Playback mode.
11. Turn the power switch of STUDIO VTR ON and insert the cassette tape and place the unit Playback mode.
12. Connect the scope to TP11 on the LUMINANCE PLAYBACK P.C.B. (STUDIO VTR).
13. While observing the Y RF OUT signal on the scope, play back the series of six short recordings just made.
14. Observe which of the six recordings produces maximum Y RF OUT level. Write down the signal generator level used to produce that recording.
15. Remove the jumper wire and the signal generator. Connect the HEAD CONNECTOR (P31) to the unit.

16. Turn the color bar switch ON. Connect scope to TP5 on the HEAD CONNECTION C.B.A.
17. Place the unit in Record mode. Then adjust VR6 (Y CURR) until the amplitude level shown as "WmV" in Fig. 2-5-12 is equal to the signal generator level written down in step 14.

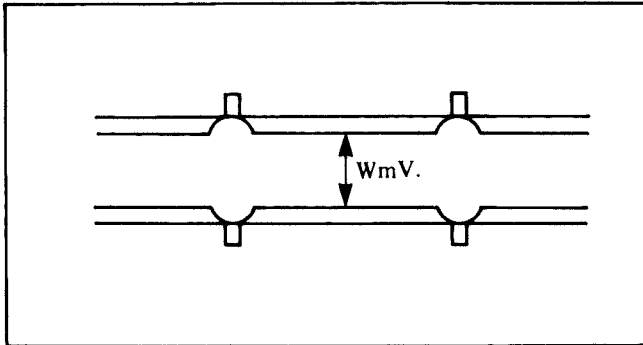


Fig. 2-5-12. Y RECORDING CURRENT

2-5-6. I COMPRESSOR INPUT LEVEL ADJUSTMENT

Test Point: TP14

Adjustment: VR7 (I COMPR LEVEL)

1. Turn the power and the color bar switches ON.
2. Connect scope to TP14.
3. Adjust VR7 (I COMPR LEVEL) to 248 mVp-p $\pm$ 5mVp-p as shown in Fig. 2-5-13.

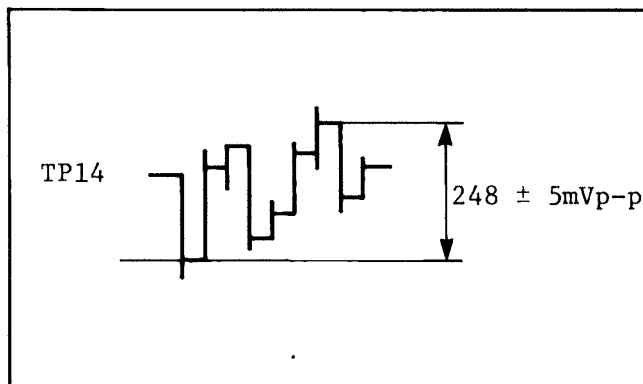


Fig. 2-5-13. I COMPRESSOR INPUT LEVEL

2-5-7. IQ CLAMP PULSE ADJUSTMENT

Test Points: TP13, TP41

Adjustment: VR20 (CL POS)

1. Turn the power and the color bar switches ON.
2. Connect scope CH1 to TP13 and CH2 to TP41. Set scope in CHOP mode.

3. Adjust VR20 (CL POS) so that the T period of the signal is $8.0\mu\text{sec} \pm 0.2\mu\text{sec}$, as shown in Fig. 2-5-14.
4. Confirm that the T' portion of the signal is $1.4\mu\text{sec} \pm 0.1\mu\text{sec}$, as shown in Fig. 2-5-14.

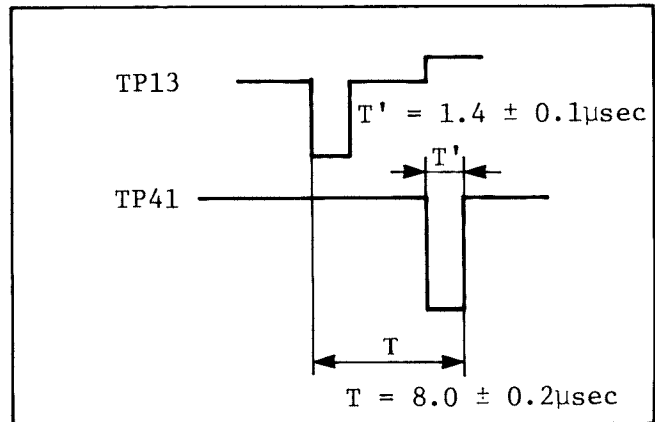


Fig. 2-5-14. I.Q CLAMP PULSE

2-5-8. I DEVIATION ADJUSTMENT (USE STUDIO VTR)

Test Point: TP12

Adjustments: VR8 (I DEV)
VC2 (I FREQ)

1. Remove the screw (A), then remove C.B.A. VIDEO PROCESS. Connect extension cable SERVO SYSTEM CONTROL between VIDEO PROCESS and connect in the unit.
2. Remove the YIQ RECORDING P.C.B. (STUDIO VTR).
3. Connect Y-EE IN (A.B-18) on the LUMINANCE PLAYBACK P.C.B. (STUDIO VTR) and I-EE IN (A.B-17) on the CHROMINANCE PLAYBACK P.C.B. (STUDIO VTR).
4. Connect the signal generator to the I-EE IN (A.B-17) on the CHROMINANCE PLAYBACK P.C.B.
5. Connect scope to TP6 on the CHROMINANCE PLAYBACK P.C.B. (STUDIO VTR).
6. Turn the power and the color bar switches ON on the PORTABLE VTR and the power switch ON on the STUDIO VTR.
7. Adjust VC2 (I FREQ) and VR2 (I DEV) so that the frequency of the minimum I level is $5.09\text{MHz} \pm 0.05\text{MHz}$ and the frequency of the maximum I level is $5.91\text{MHz} \pm 0.05\text{MHz}$, and the deviation is $1.0\text{MHz} \pm 0.03\text{MHz}$, as shown in Fig. 2-5-15.

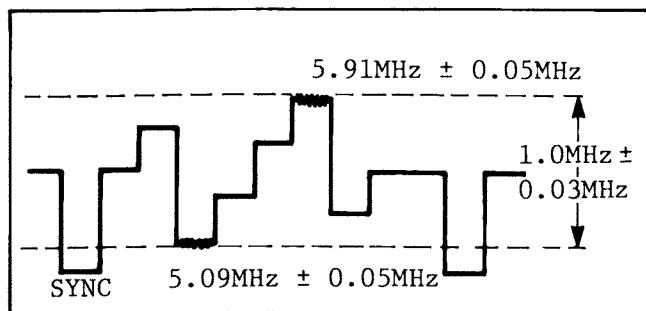


Fig. 2-5-15. I DEVIATION

2-5-9. Q DEVIATION ADJUSTMENT (USE STUDIO VTR)

Test Point:

Adjustments: VR10 (Q DEV)
VC3 (Q FREQ)

1. Remove the screw (A), then remove the VIDEO PROCESSOR P.C.B. (P-1). Connect extension cable between VIDEO PROCESS and connector in the unit.
2. Remove the YIQ RECORDING P.C.B. (STUDIO VTR).
3. Connect the Y-EE IN (A.B-18) on the LUMINANCE PLAYBACK P.C.B. (STUDIO VTR) and Q-EE IN (A.B-18) on the CHROMINANCE PLAYBACK P.C.B. (STUDIO VTR).
4. Connect the signal generator to the Q-EE IN (A.B-18) on the CHROMINANCE P.C.B.
5. Connect the scope to TP10 on the CHROMINANCE PLAYBACK P.C.B. (STUDIO VTR).
6. Turn the power and the color bar switches ON on the PORTABLE VTR and the power switches ON on the STUDIO VTR.
7. Adjust VC3 (Q FREQ) and VR2 (Q DEV) so that the frequency of the minimum Q level is $0.82\text{MHz} \pm 0.05\text{MHz}$ and the frequency of the maximum Q level is $1.18\text{MHz} \pm 0.05\text{MHz}$ and the deviation is $0.36\text{MHz} \pm 0.015\text{MHz}$ as shown in Fig. 2-5-16.

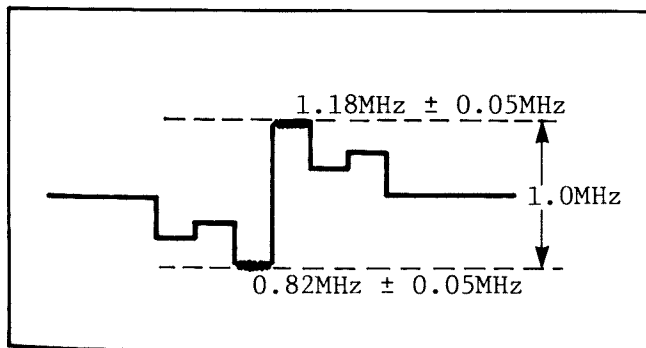


Fig. 2-5-16. Q DEVIATION

2-5-10. Q DARK ADJUSTMENT

Test Point: TP25

Adjustment: VR11 (Q DC)

1. Turn the power and the color bar switches ON.
2. Connect a jumper between TP14 and TP23.
3. Connect the scope to TP25.
4. Adjust VR11 (Q DC) so that the clip level is 700%.

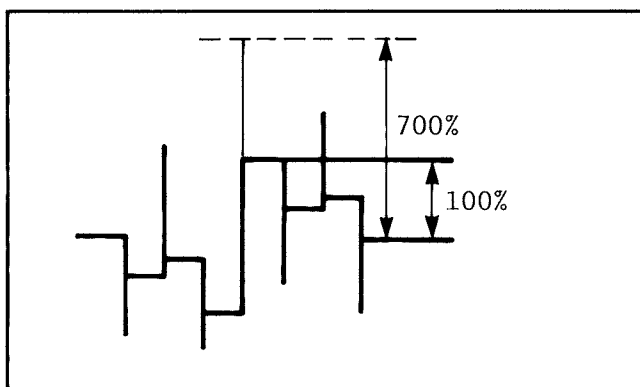


Fig. 2-5-17. Q DARK CLIP

2-5-11. CHROMA RECORDING AMP FREQUENCY CHARACTERISTIC ADJUSTMENT

Test Point: TP7 on the
HEAD CONNECTION C.B.A.

Adjustment: VC5 (I FC)

1. Turn VR9 (I CURR) clockwise and VR12 (Q CURR) counterclockwise.
2. Turn the power switch ON.
3. Connect the sweep generator to TP7 and adjust the level of the sweep generator to 160mV at 4.5MHz.
4. Adjust VC5 (I FC) as shown in Fig. 2-5-18.

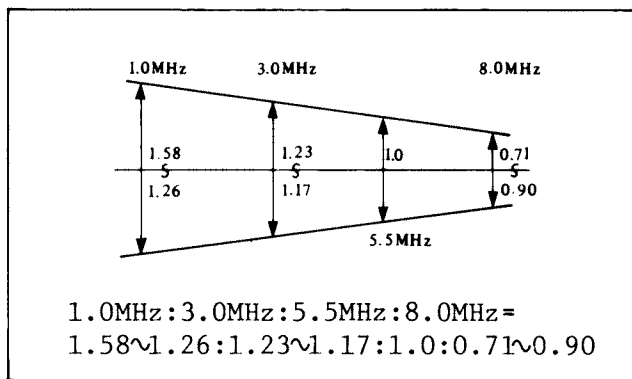


Fig. 2-5-18. CHROMA RECORDING AMP
FREQUENCY CHARACTERISTIC

2-5-12. CHROMA RECORDING CURRENT ADJUSTMENT (USE STUDIO VTR)

Test Points: TP7, TP8 on the
HEAD CONNECTION C.B.A.

Adjustments: VR9 (I CURR)
VR12 (Q CURR)

1. Turn VR9 (I CURR) clockwise and VR12 (Q CURR) counterclockwise.
2. Turn the power switch ON and connect the signal generator to TP39.
3. Adjust the frequency of the signal generator to 5.5MHz.
4. Connect the scope to TP7 on the HEAD CONNECTION C.B.A.
5. Insert a cassette. Then adjust the level of the signal generator successively to 60mV, 80mV, 100mV, 120mV, 140mV and 160mV.
6. Make a recording at each signal generator level.
7. Remove P53 and P54 of HEAD AMPLIFIER P.C.B. (STUDIO VTR).
8. Connect the VTR to the HEAD AMPLIFIER P.C.B. (STUDIO VTR) by the HEAD AMP CONNECTOR, C OUTPUT to P54 and Y OUTPUT to P53.

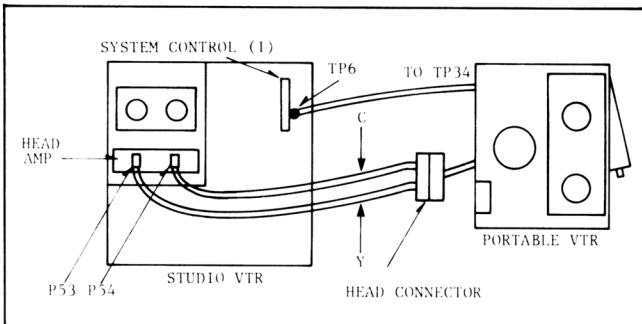


Fig. 2-5-19. CROMA RECORDING CURRENT CONNECTION

9. Connect a jumper wire between GND and TP6 on the DRUM SERVO P.C.B. (STUDIO VTR).
10. Connect a jumper wire between TP6 on the SYSTEM CONTROL (I) P.C.B. (STUDIO VTR) and TP34 on the SERVO SYSTEM CONTROL P.C.B. (PORTABLE VTR).
11. Connect a jumper wire between B-15 and TP5 (PORTABLE VTR) to simulate Playback mode.
12. Turn the power switch of STUDIO VTR ON, insert a cassette tape and place the unit Playback mode.
13. Connect the scope to TP2 on the CHROMINANCE PLAYBACK P.C.B.

14. While observing the C RF OUT signal on the scope, play back the series of six short recordings just made.
15. Observe which of the six recording produces maximum C RF OUT level. Write down the signal generator level used to produce that recording.
16. Connect the scope to TP7 on the HEAD CONNECTION C.B.A. and connect the HEAD CONNECTOR (P31).
17. Remove the jumper wire and the signal generator. Turn the color bar switch ON.
18. Place the unit in the record mode. Then adjust VR9 (I CURR) until the amplitude level shown as "WmV" in Fig. 2-5-20 is equal to the signal generator level written down in step 15.
19. Adjust VR12 (Q CURR) to 40mVp-p at TP7 as shown in Fig. 2-5-21.

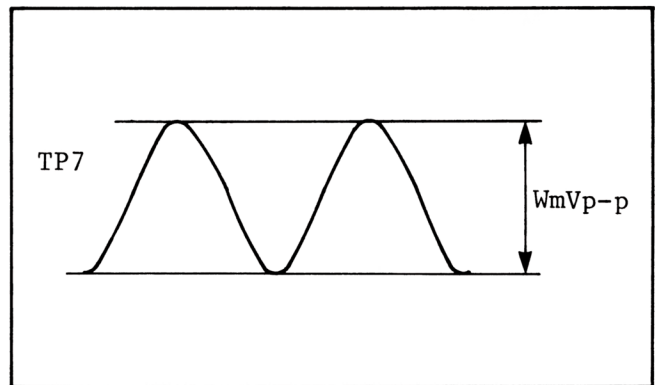


Fig. 2-5-20. I RECORDING CURRENT

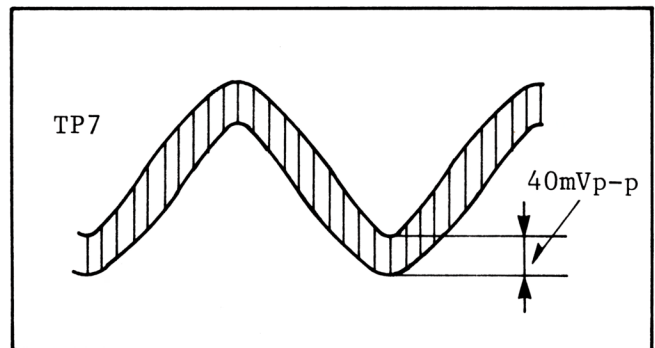


Fig. 2-5-21. Q RECORDING CURRENT

2-6. AUDIO SECTION (P-3)

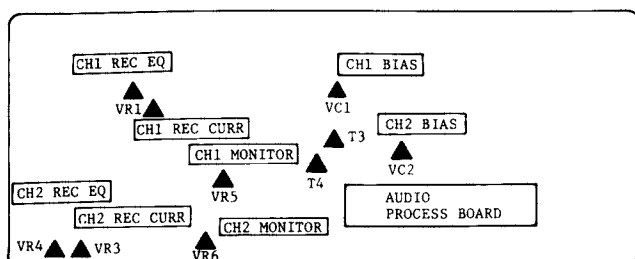


Fig. 2-6-1. AUDIO PROCESSOR CONTROL LOCATION

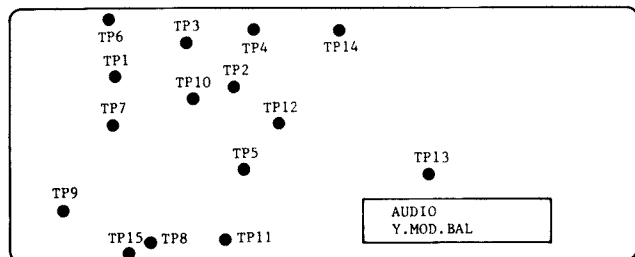


Fig. 2-6-2. AUDIO PROCESSOR TEST POINT LOCATION

1. Turn the power switch OFF.
2. Remove the 4 plastic rivets (C) securing the TIME CODE GENERATOR C.B.A. and remove the TIME CODE GENERATOR C.B.A. (P-4).
3. Remove the 2 screws (D) securing the shield plate and remove shield plate.
4. Remove the 2 screws (E) securing and remove connector board assembly.

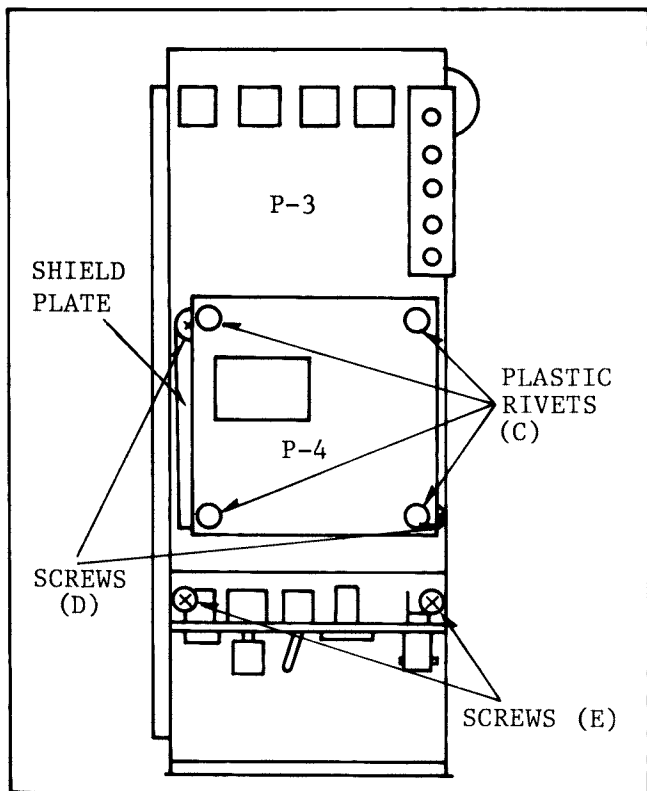


Fig. 2-6-3. ADJUSTMENT CONDITION

2-6-1. CONFIRMATION OF FULL ERASE

Test Point: FULL ERASE HEAD

1. Turn the power switch ON.
2. Insert a cassette and make a recording.
3. Connect the scope to the Full Erase Head.
4. Confirm that the signal level is more than 80Vp-p and that the frequency is $100\text{kHz} \pm 15\text{kHz}$.

2-6-2. BIAS TRAP ADJUSTMENT

Test Points: TP4, TP10

Adjustments: T3 (CH1 BIAS TRAP)
T4 (CH2 BIAS TRAP)

1. Turn the power switch ON.
2. Connect the scope to TP4. Insert a cassette and make a recording.
3. Adjust T3 (CH1 BIAS TRAP) so that the bias level is minimized.
4. Connect the scope to TP10.
5. Adjust T4 (CH2 BIAS TRAP) so that the bias level is minimized.

2-6-3. RECORDING BIAS ADJUSTMENT

Test Points: CH1 CH2
on the A/C HEAD C.B.A.

Adjustments: VC1 (CH1 BIAS)
VC2 (CH2 BIAS)

1. Turn the power switch ON.
2. Connect the VTVM to CH1 on the A/C HEAD C.B.A.
3. Insert a cassette and make a recording.
4. Adjust VC1 (CH1 BIAS) to 8.0mVrms.
5. Connect the VTVM to CH2 on the A/C HEAD C.B.A.
6. Adjust VC2 (CH2 BIAS) to 8.0mVrms.

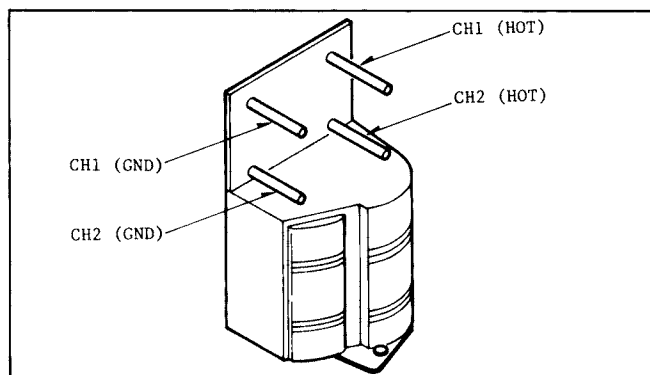


Fig. 2-6-4. AUDIO CONTROL HEAD

2-6-4. RECORDING CURRENT ADJUSTMENT

Test Points: CH1, CH2

on the A/C HEAD C.B.A.

Adjustments: VR1 (CH1 REC CURRENT)

VR3 (CH2 REC CURRENT)

1. Connect a jumper wire between the Base of Q7 and GND.
2. Turn the power switch ON. Insert a cassette and make a recording.
3. Supply a -60dBm sinewave signal at 1kHz to the CH1 MIC IN jack.
4. Connect the VTVM to TP3 on the AUDIO P.C.B. (P-3)
5. Adjust P.C.B. REC VR to 1Vrms at TP3.
6. Then boost up the sinewave signal by 8dBm and connect a jumper wire between A14 and A16.
7. Connect the VTVM to CH1 on the A/C HEAD C.B.A.
8. Adjust VR1 (CH1 REC CURRENT) to 1.35 +0, -0.05mVrms at CH1.
9. Remove the jumper between A14 and A16.
10. Supply a -60dBm sinewave signal at 1kHz to the CH2 MIC IN jack.
11. Connect the VTVM to TP9 on the AUDIO P.C.B. (P-3)
12. Adjust the REC VR to 1Vrms at TP9.
13. Then boost up the sinewave signal by 8dBm and connect a jumper wire between A14 and A16.
14. Connect the VTVM to CH2 on the A/C HEAD C.B.A.
15. Adjust VR3 (CH2 REC CURRENT) to 1.35 +0, -0.05mVrms at CH2.
16. Turn the power switch OFF.
17. Remove the jumpers.

2-6-5. RECORDING EQUALIZER ADJUSTMENT

Test Points: CH1, CH2

on the A/C HEAD C.B.A.

TP3, TP9

Adjustments: VR2 (CH1 REC EQ)

VR4 (CH2 REC EQ)

1. Connect a jumper wire between the Base of Q7 and GND.
2. Turn the power switch ON. Insert a cassette and make recording.
3. Supply a -60dBm sinewave signal at 1kHz to the CH1 MIC IN jack. Connect the VTVM to TP3.
4. Adjust REC VR to 1Vrms at TP3.

5. Then boost up the sinewave signal by 8dBm and connect a jumper wire between A14 and A16.
6. Connect the VTVM to CH1 on the A/C HEAD C.B.A.
7. Confirm that the level is 1.35 +0, -0.05mVrms.
8. Adjust the frequency of the signal generator to 15kHz.
9. Adjust VR2 (CH1 REC EQ) to 1.35 +0, -0.05mVrms at TP1.
10. Remove the jumper between A14 and A16.
11. Supply a -60dBm sinewave signal at 1kHz to the CH2 MIC IN jack.
12. Connect the VTVM to TP9 and adjust the REC VR to 1Vrms at TP9.
13. Then boost up the sinewave signal by 8dBm and connect a jumper wire between A14 and A16.
14. Connect the VTVM to CH2 on the A/C HEAD C.B.A.
15. Confirm that the level is 1.35 +0, -0.05mVrms.
16. Adjust the frequency of the signal generator to 15kHz.
17. Adjust VR4 (CH2 REC EQ) to 1.35 +0, -0.05mVrms at CH2.
18. Turn the power switch OFF.
19. Remove the jumpers.

2-6-6. MONITOR LEVEL ADJUSTMENT

Test Points: TP3, TP9, TP5, TP11

Adjustments: VR5 (CH1 MONITOR)

VR6 (CH2 MONITOR)

1. Turn the power switch ON.
2. Supply a -60dBm sinewave signal at 1kHz to the CH1 MIC IN jack.
3. Connect the VTVM to TP3. Adjust REC VR to 1Vrms.
4. Connect the DVM to TP5 and adjust VR5 (CH1 MONITOR) to 5.0V DC.
5. Supply a -60dBm sinewave signal at 1kHz to the CH2 MIC IN.
6. Connect the VTVM to TP9. Adjust REC VR to 1Vrms.
7. Connect the DVM to TP11 and adjust VR6 (CH2 MONITOR) to 5.0V DC.

2-7. TIME CODE SECTION (P-4)

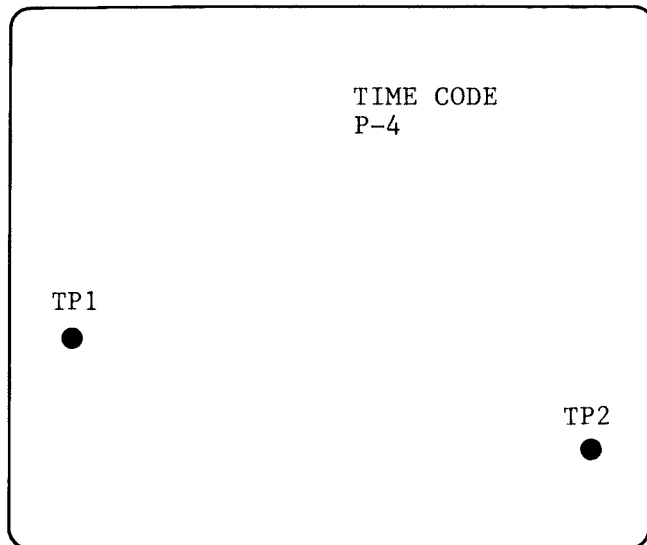


Fig. 2-7-1. TIME CODE TEST POINT LOCATION

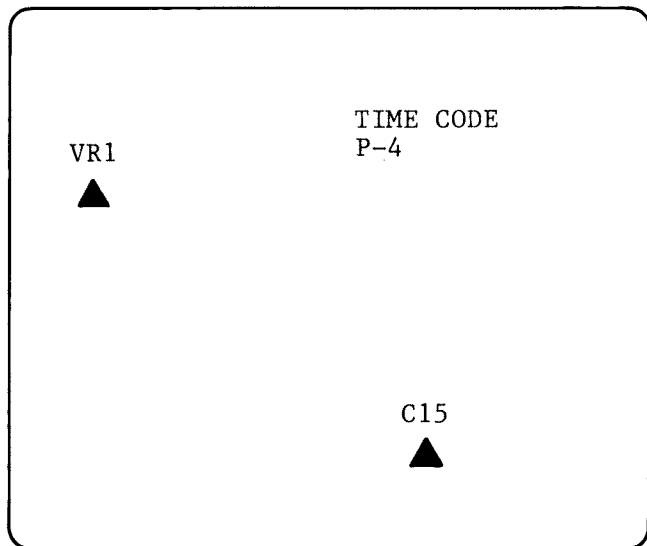


Fig. 2-7-2. TIME CODE CONTROL LOCATION
P.C.B LOCATION

2-7-1. CLOCK FREQUENCY ADJUSTMENT

Test Point: TP1

Adjustment: VR1

1. Connect the frequency counter to TP1 on the TIME CODE P.C.B. (P-4).
2. Adjust VR1 so that the frequency is $250\text{kHz} \pm 10\text{kHz}$.
3. Remove the frequency counter.

2-7-2. TIME CODE REFERENCE CLOCK ADJUSTMENT

Test Point: TP2

Adjustment: C15

1. Connect the frequency counter to TP2 on the TIME CODE P.C.B. (P-4).
2. Adjust C15 so that the frequency is $76.7232\text{kHz} \pm 2\text{Hz}$.
3. Remove the frequency counter.

ADJUSTMENT USING PLAYBACK KIT

The following adjustment is not only Studio VTR but also adjustable by Playback Kit.

2-4. SERVO SECTION

- 2-4-5. PG SHIFTER ADJUSTMENT
- 2-4-7. TRACKING FIX ADJUSTMENT

2-5. VIDEO SECTION

- 2-5-2. Y DEVIATION & CARRIER
BALANCE ADJUSTMENT
- 2-5-5. Y RECORDING CURRENT ADJUSTMENT
- 2-5-8. I DEVIATION ADJUSTMENT
- 2-5-9. Q DEVIATION ADJUSTMENT
- 2-5-12. CHROMA RECORDING CURRENT
ADJUSTMENT

The above adjustment procedures are described below.

2-4-5. PG SHIFTER ADJUSTMENT (USE PLAYBACK KIT)

Test Points: TP34
Y OUTPUT of PLAYBACK KIT
Adjustments: VR12 (PG SHIFTER A)
VR13 (PG SHIFTER B)

1. Connect the VTR to the PLAYBACK KIT by the HEAD AMP CONNECTOR, as shown in Fig. 1.

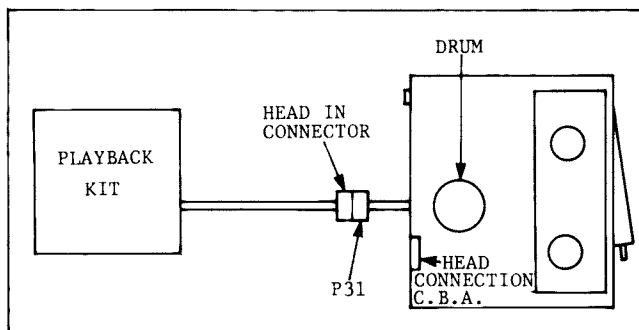


Fig. 1. ADJUSTMENT CONDITION

2. Connect a jumper wire between B-15 and TP5 to simulate the condition is Playback mode.
3. Turn the power switch ON and insert the alignment tape and make a re-recording.
4. Connect scope CH1 to Y OUTPUT on the PLAYBACK KIT and connect CH2 to TP34. Set scope in CHOP mode.
5. Expand the falling edge of the switching pulse.

6. Adjust VR12 (PG SHIFTER A) so that the falling edge of the switching pulse is $3.25H \pm 0.5H$ before the start of the vertical sync, as shown in Fig. 2.

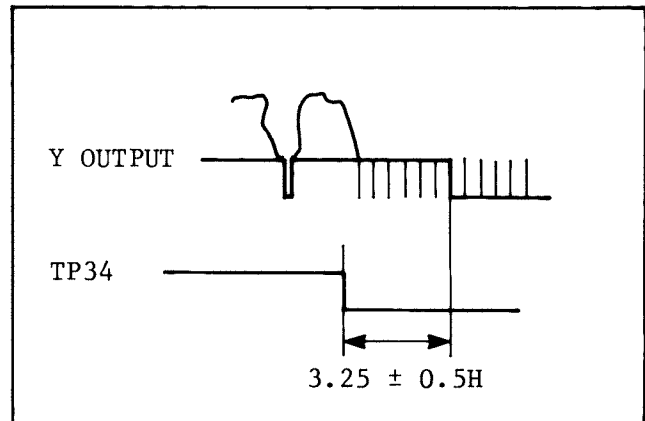


Fig. 2 PG SHIFTER A

7. Expand the rising edge of the switching pulse.
8. Adjust VR13 (PG SHIFTER B) so that the rising edge of the switching pulse is $3.25H \pm 0.5H$ before the start of the vertical sync, as shown in Fig. 3.

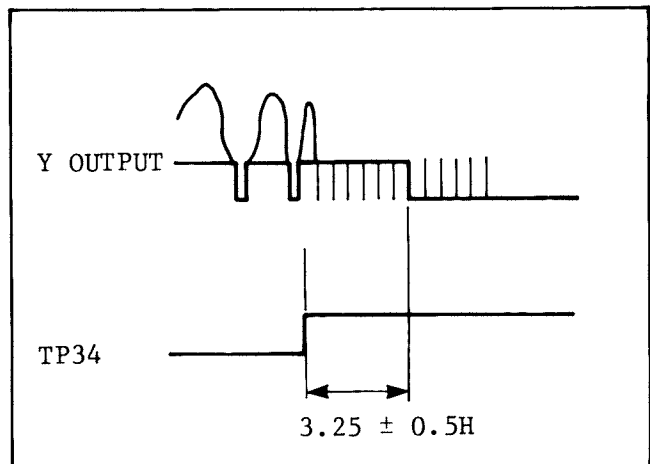


Fig. 3. PG SHIFTER B

9. Switch the slope selector on the scope to either + (plus) or - (minus) then adjust VR13 (PG SHIFTER B) so that the difference between the rising and falling edges of the switching pulse is less than 6 sec as shown in Fig. 4.

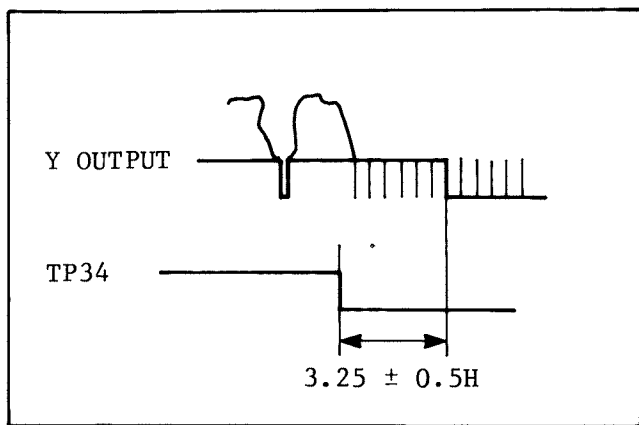


Fig. 4 PG SHIFTER

10. Remove the jumper wire and the PLAYBACK KIT.

2-4-7. TRACKING FIX ADJUSTMENT (USE PLAYBACK KIT)

Test Points: TP34
C OUTPUT of PLAYBACK KIT
Adjustment: VR9 (TRACK FIX)

1. Turn the power and color bar switches ON.
2. Insert a cassette and make a recording for a few minutes.
3. Rewind the just-recorded portion of the tape.
4. Connect the VTR to the PLAYBACK KIT by the HEAD AMP CONNECTOR.

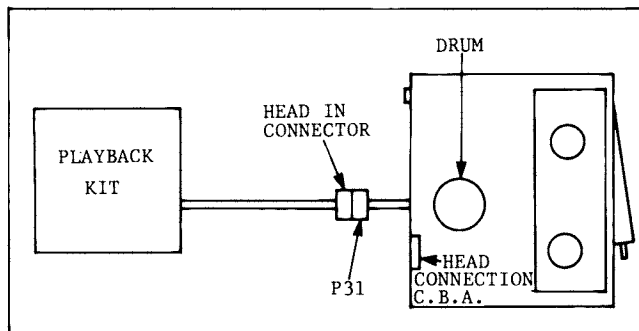


Fig. 5. ADJUSTMENT CONDITION

5. Connect a jumper wire between B-15 and TP5 to simulate playback mode.
6. Connect the scope CH2 to C-RF OUTPUT on the PLAYBACK KIT and connect CH2 to TP34. Set the scope in the CHOP mode.
7. Adjust the VR9 so that the C OUTPUT CH1 is maximum.

2-5. VIDEO SECTION

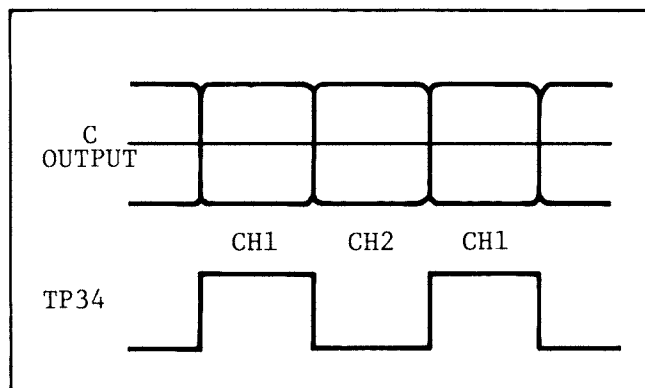


Fig. 6. TRACKING FIX ADJUSTMENT

2-5-2. Y DEVIATION & CARRIER BALANCE (USE PLAYBACK KIT)

Test Point: TP7
(Y OUTPUT of PLAYBACK KIT)
Adjustments: VR3 (Y MOD BAL)
VR2 (Y DEV)
VC1 (Y FREQ)

1. Remove the screw, then remove the VIDEO PROCESSOR P.C.B. (P-1). Connect extension cable between the VIDEO PROCESSOR (P-1) and connector in the unit.
2. Connect the E-E input of the PLAYBACK KIT to the E-E output (P30) on VIDEO PROCESSOR P.C.B. (P-1). Connect signal generator to Y SG IN at PLAYBACK KIT. Connect scope to the Y OUT of the PLAYBACK KIT, as shown in Fig. 7.

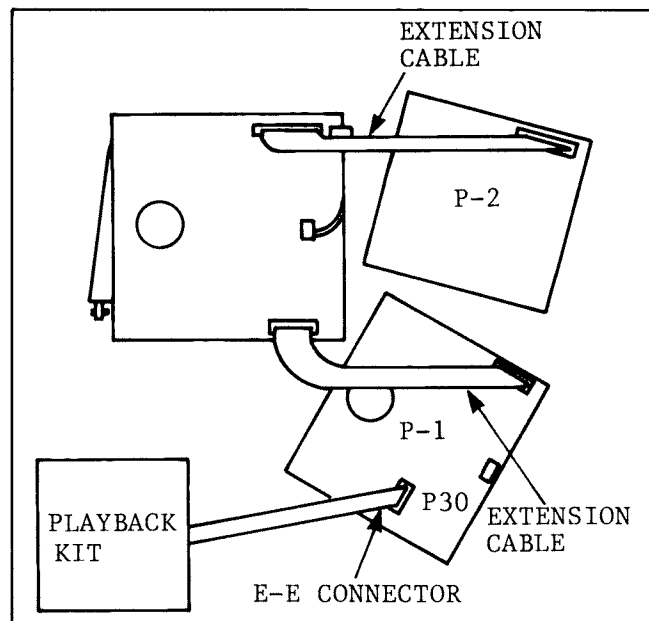


Fig. 7. E-E. ADJUSTMENT CONDITION

3. Turn the power and the color bar switches ON.
4. Adjust VC1 (Y FREQ) and VR2 (Y DEV) so that the sync tip frequency is $4.3\text{MHz} \pm 0.05\text{MHz}$ and white peak frequency is $5.9\text{MHz} \pm 0.05\text{MHz}$ and the deviation is $1.6\text{MHz} \pm 0.03\text{MHz}$, as shown in Fig. 8.

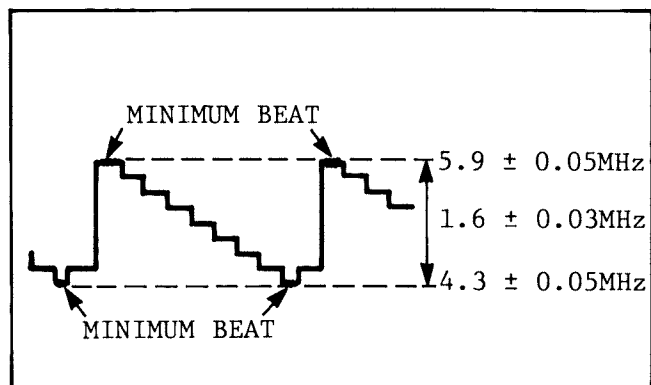


Fig. 8. Y. DEVIATION

5. Connect a jumper wire between TP2 and the GND near TP2. Connect the spectrum analyzer to TP7.
6. Adjust VR3 (Y MOD BAL) so that the 2nd harmonic carrier level is minimized.

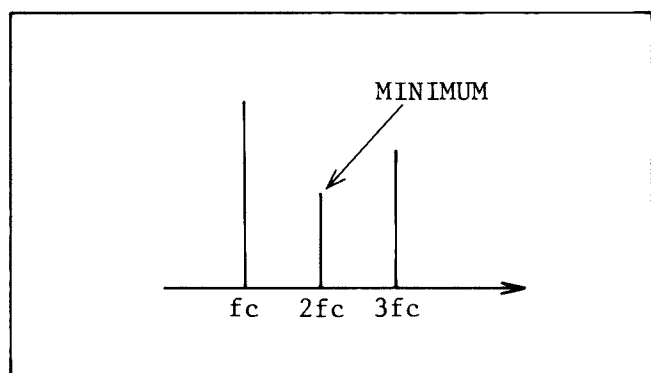


Fig. 9. CARRIER BALANCE

Note:

If a spectrum analyzer is not available, adjust for minimum distortion in the H sync portion.

7. Remove the jumper wire and the PLAYBACK KIT. Confirm the levels set in step 4.

2-5-5. Y RECORDING CURRENT ADJUSTMENT (USE PLAYBACK KIT)

Test Points: TP5, TP6 on the HEAD CONNECTION C.B.A.

Adjustment: VR6 (Y CURR)

1. Turn VR6 (Y CURR) clockwise.
2. Turn the power switch ON and connect the signal generator to TP38.
3. Adjust the frequency of the signal generator to 5.33MHz.
4. Connect the scope to TP5 on the HEAD CONNECTION C.B.A.
5. Insert a cassette, then adjust the level of the signal generator successively to 100mV, 120mV, 140mV, 160mV, 180mV and 200mV and make a recording at each signal generator level.
6. Connect jumper wire between TP42 and TP5 on the SERVO SYSTEM CONTROL P.C.B. (P-2) to simulate the condition is Playback mode.
7. Connect the HEAD INPUT of the PLAYBACK KIT to the HEAD CONNECTOR (P31) on the unit, as shown in Fig. 10. Connect scope to Y RF OUT of the PLAYBACK KIT.

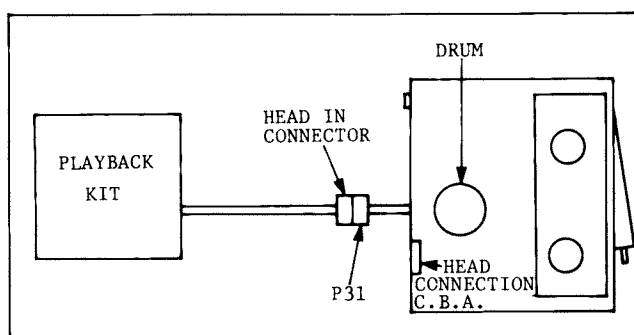


Fig. 10. ADJUSTMENT CONDITION

8. While observing the Y RF OUT signal on the scope, play back the series of six short recordings just made.
9. Observe which of the six recordings produces maximum Y RF OUT level. Write down the signal generator level used to produce that recording.
10. Remove the jumper wire and the PLAYBACK KIT and the signal generator. Connect the HEAD CONNECTOR (P31) to the unit.
11. Turn the color bar switch ON. Connect scope to TP5 on the HEAD CONNECTION C.B.A.

12. Place the unit in the Record mode. Then adjust VR6 (Y CURR) until the amplitude shown as "WmV" in Fig. 11. is equal to the signal generator level written down in step 9.

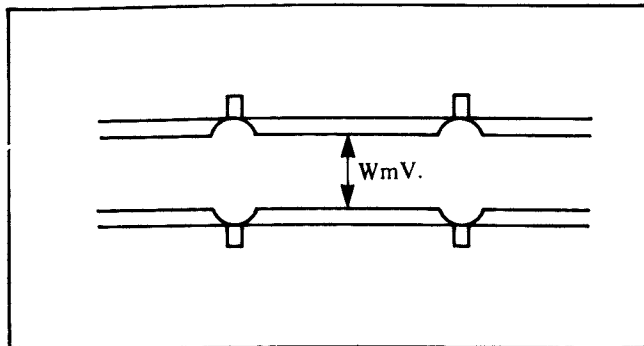


Fig. 11. Y RECORDING CURRENT

2-5-8. I DEVIATION ADJUSTMENT (USE PLAYBACK KIT)

Test Point: TP12
(I OUTPUT of PLAYBACK KIT)
Adjustments: VR8 (I DEV)
VC2 (I FREQ)

1. Remove the screw (A), then remove the VIDEO PROCESSOR P.C.B. (P-1). Connect extension cable between the VIDEO PROCESSOR P.C.B. (P-1) and connector in the unit.
2. Connect the EE input of the PLAYBACK KIT to the EE output (P30) on the VIDEO PROCESSOR P.C.B. (P-1). Connect the signal generator to I SG IN at PLAYBACK KIT. Connect scope to the I OUT of the PLAYBACK KIT.
3. Turn the power and the color bar switches ON.
4. Adjust VC2 (I REQ) and VR2 (I DEV) so that the frequency of the minimum I level is $5.09\text{MHz} \pm 0.05\text{MHz}$, and the frequency of the maximum I level is $5.91\text{MHz} \pm 0.05\text{MHz}$ and the deviation is $1.0\text{MHz} \pm 0.03\text{MHz}$, as shown in Fig. 12.
5. Remove the PLAYBACK KIT.

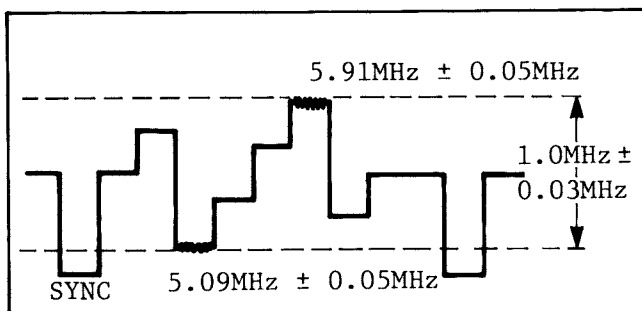


Fig. 12. I DEVIATION ADJUSTMENT

2-5-9. Q DEVIATION ADJUSTMENT (USE PLAYBACK KIT)

Test Point: TP40
(Q OUTPUT of PLAYBACK KIT)
Adjustments: VR10 (Q DEV)
VC3 (Q FREQ)

1. Remove the screw (A), then remove the VIDEO PROCESSOR P.C.B. (P-1) and connector in the unit.
2. Connect the EE INPUT of the PLAYBACK KIT to the EE OUTPUT (P30) on the VIDEO PROCESSOR P.C.B. (P-1). Connect signal generator to Q SG IN at PLAYBACK KIT. Connect scope to the Q OUT of the PLAYBACK KIT.
3. Turn the power and the color bar switches ON.
4. Adjust VC3 (Q FREQ) and VR10 (Q DEV) so that the frequency of the minimum Q level is $0.82\text{MHz} \pm 0.05\text{MHz}$ and the frequency of the maximum Q level is $1.18\text{MHz} \pm 0.05\text{MHz}$ and the deviation is $0.36\text{MHz} \pm 0.015\text{MHz}$ as shown in Fig. 13.
5. Remove the PLAYBACK KIT.

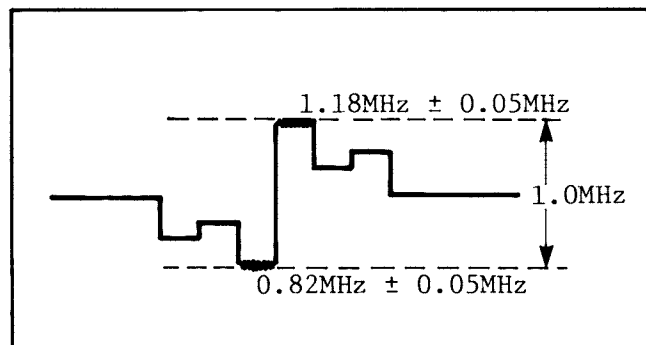


Fig. 13. Q DEVIATION ADJUSTMENT

2-5-12. CHROMA RECORDING CURRENT ADJUSTMENT (USE PLAYBACK KIT)

Test Points: TP7, TP8 on the
HEAD CONNECTION C.B.A.

Adjustments: VR9 (I CURR)
VR12 (Q CURR)

1. Turn VR9 (I CURR) clockwise and VR12 (Q CURR) counterclockwise.
2. Turn the power switch ON and connect the signal generator to TP39.
3. Adjust the frequency of the signal generator to 5.5MHz.
4. Connect the scope to TP7 on the HEAD CONNECTION C.B.A.
5. Insert a cassette, then adjust the level of the signal generator successively to 60mV, 80mV, 100mV, 120mV, 140mV and 160mV. Make a recording at each signal generator level.
6. Connect a jumper wire between B-15 and TP5 on C.B.A. SERVO/SYSTEM CONTROL P.C.B.
7. Connect the HEAD INPUT of the PLAYBACK KIT to the HEAD CONNECTOR (P31) on the unit, as shown in Fig. 14.

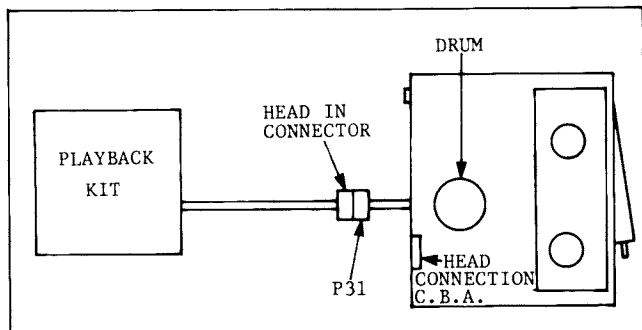


Fig. 14. ADJUSTMENT CONDITION

8. While observing the C RF OUT signal on the scope, play back the series of six short recordings just made.
9. Observe which of the six recording produces maximum C RF OUT level. Write down the signal generator level used to produce that recording.
10. Connect the scope to TP7 on the HEAD CONNECTION C.B.A. and connect the HEAD CONNECTOR (P31) to the unit.
11. Turn the color bar switch ON. Remove the jumper wire and the signal generator.

12. Place the unit in the record mode. Then adjust VR9 (I CURR) until the amplitude level shown as "WmV" in figure is equal to the signal generator level written down in step 15.

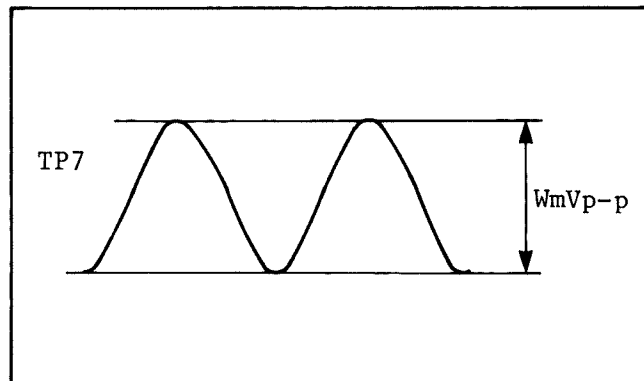


Fig. 15. I RECORDING CURRENT

13. Adjust VR12 (Q CURR) to 40mVp-p at TP7 as shown in Fig. 16.

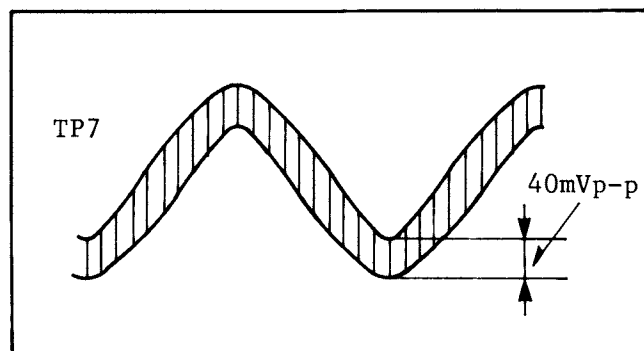


Fig. 16. Q RECORDING CURRENT

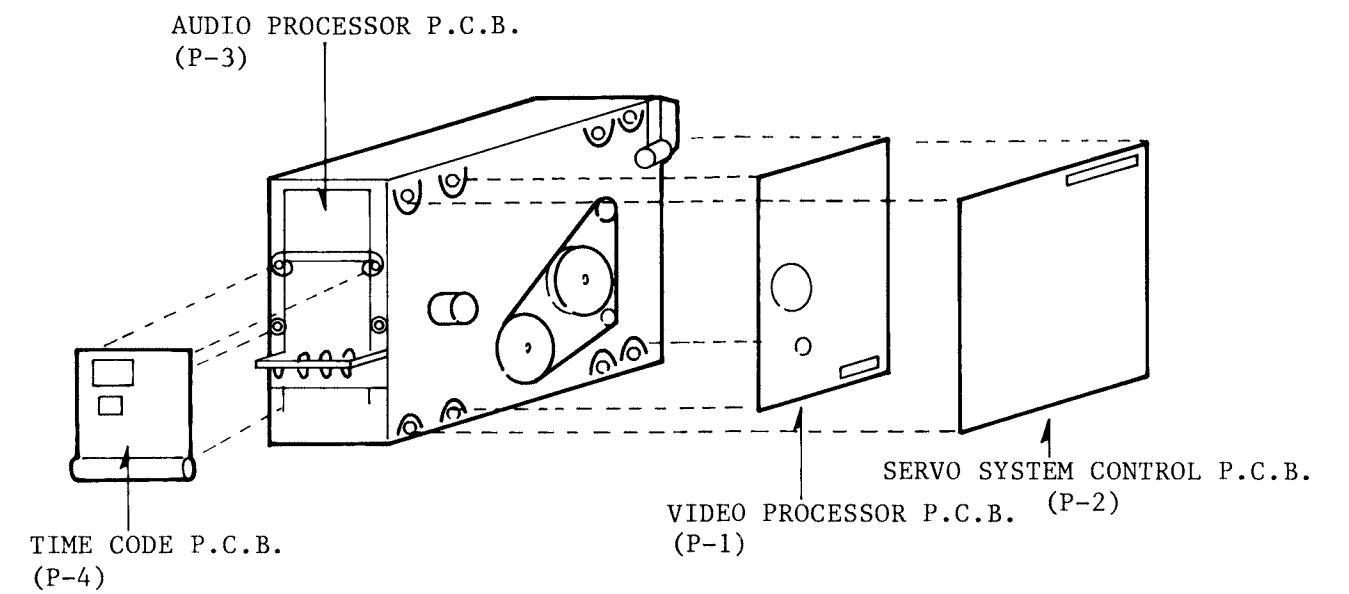


Fig. P.C.B. LOCATION

Panasonic_®
MATSUSHITA ELECTRIC

Service Manual

RECAM™

Mechanical Adjustment

Portable VTR
AU-100A



SPECIFICATIONS

General

Power Source: 12V DC
 Power Consumption: 12W
 Recording System: 4 rotary heads, helical scanning, separate Y/C track system
 Tape Run Mechanism: M-format (1/2" tape)
 Tape Speed: 204.5 mm/s
 Tape: NV-T120 HG tape
 Recording/Playback Time: 20 minutes (NV-T120 HG tape)
 FF/REW Time: Less than 5 minutes (NV-T120 HG tape)
 Weight: Approx. 9.02 lbs. (4.1 kg)
 Dimensions: 4-3/4" (W) × 9-3/8" (H) × 10" (D)
 120(W) × 237(H) × 253(D) mm

Video

Television System: NTSC system, 525 lines, 60 fields
 Modulation System: Frequency modulation for luminance signal
 Frequency modulation multiplexing for chrominance signal (I/Q)
 Bandwidth: 3.8 MHz for luminance
 1.0 MHz for chrominance
 Inputs: Y: 1.0 Vp-p (75% color bar), 75Ω unbalanced
 I: 0.714 Vp-p, 75Ω unbalanced
 Q: 0.714 Vp-p, 75Ω unbalanced
 Outputs: NTSC composite video, 1.0 Vp-p, 75Ω

Audio

Frequency response: 50 ~ 15,000 Hz ±3 dB
 Inputs: MIC: -60 dBm, 600Ω balanced } switch
 LINE: +4 dBm, 600Ω balanced } selectabl
 Output: EARPHONE, -20 dB ~ -32 dB (variable), 8Ω unbalanced

External Time Code:

Input: 2.5 Vp-p, 600Ω unbalanced
 Ambient Temperature: Operating: 32°F ~ 104°F (68°F reference temperature)
 Storage: -4°F ~ 140°F
 Ambient Humidity: 20% ~ 85% (50% reference humidity)

Weight and dimensions shown are approximate.
 Specifications are subject to change without notice.



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SERVICING FIXTURES & TOOLS FOR MODEL AU-100A

VFK0230	Connector Pin Remover	VFKS0009	Reel Table Height Gauge
VFKS0003	H-Position Adjustment Fixture	VFK0136	Gear Driver
VFK0231	Tension Arm Fixture	VFK0228	Reel Height Adjustment Plate
VFKS0010	Post Adjustment Plate	VFK66	Fan-Type Tension Gauge
VFK0133	Dial Torque Gauge	VFK0146	Hex Wrench (0.9mm)
VFK0134	Dial Torque Gauge Adaptor	VFK76	Hex Wrench (1.5mm)
(Purchase Locally)	Back Tension Meter	VFKS0002	Tension Post Adjustment Fixture
VFK0227	Post Height Fixture	VFK0252	Interconnection Cable
VFK0137	Post Adjustment Screwdriver	VFK0218	Extention Cable (P1)
VFK0242	Eccentric Gauge	VFK0219	Extention Cable (P2)
VFKS0004	Cassette Holder Fixture	VFK0220	Extention Cable (P3)
		VFM1080FSP	Alignment Tape

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1. DISASSEMBLY METHOD

1-1. REMOVAL OF THE CASSETTE COVER

1. Turn the VTR power switch ON and push the EJECT BUTTON. Turn the VTR power OFF.
2. Remove the 4 screws (A) securing the cassette cover. Carefully pull and turn the left portion of the cassette cover and remove it. Be careful not to damage the locking portion.

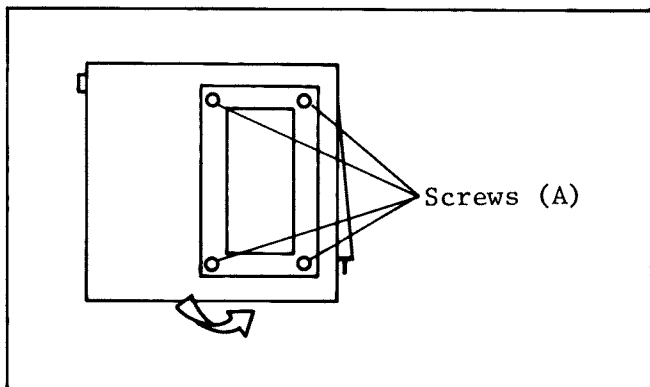


Fig. 1-1. Removal of Cassette Cover

1-2. REMOVAL OF THE VTR COVER

1. Remove the 3 screws (B) securing the VTR cover. Carefully remove it.

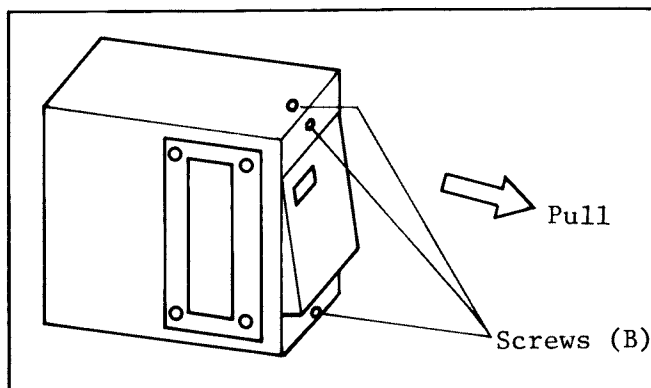


Fig. 1-2. Removal of the VTR Cover

2. REPLACEMENT AND ADJUSTMENT OF UPPER DRUM

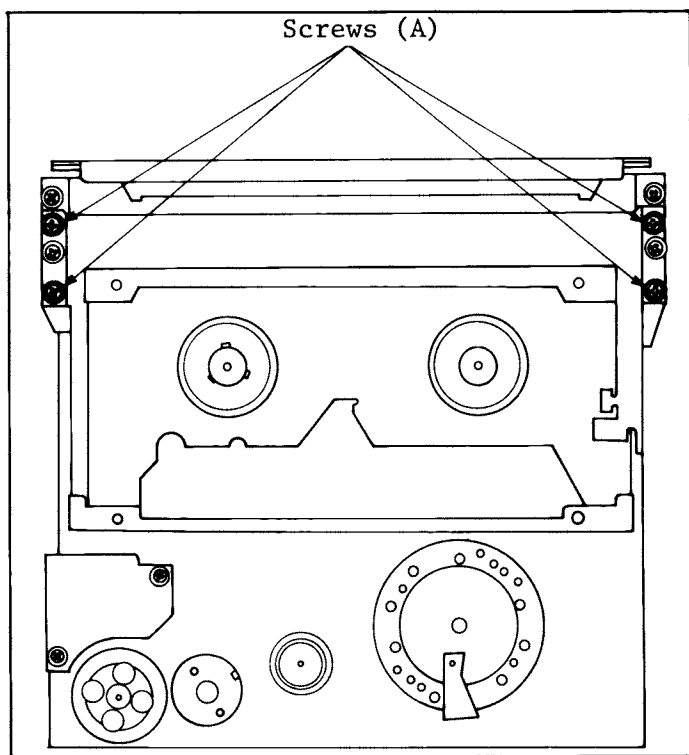


Fig. 2-1. Removal of the Cassette Compartment

Tools Required:
Reel Height Adjustment Plate
Eccentric Gauge

1. Remove the cassette cover and the VTR cover.
2. Remove the screws (A) and the cassette compartment.

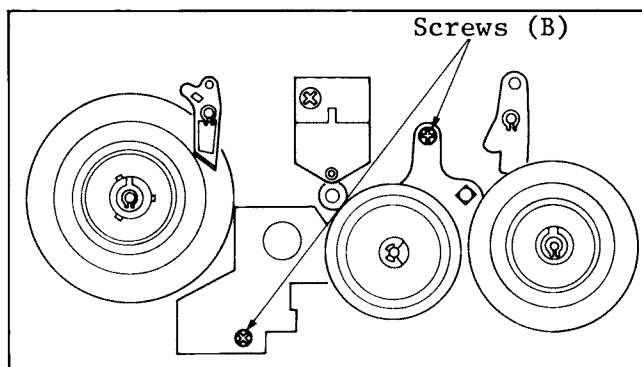


Fig. 2-2. Removal of the Screws

3. Remove the 2 screws (B).

4. Remove the 2 screws (C) of the Reel Height Adjustment Plate, and remove the supply reel table plate.

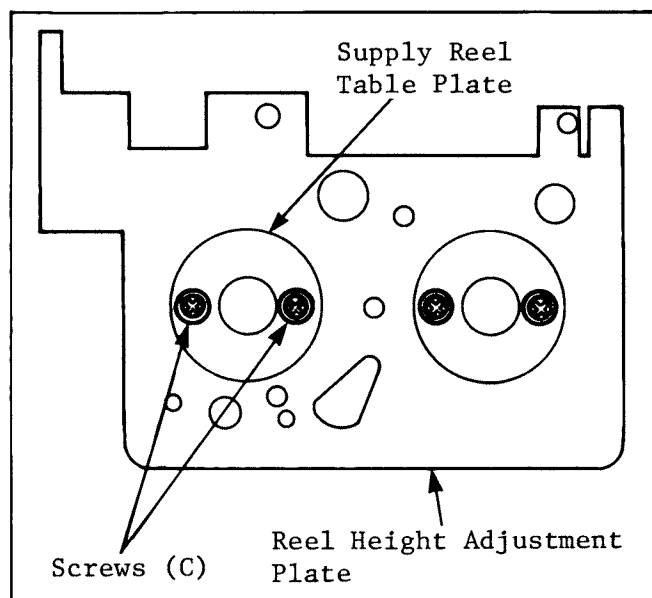


Fig. 2-3. Removal of the Reel Height Adjustment Plate

5. Set the Eccentric Gauge, and tighten the screw (D).

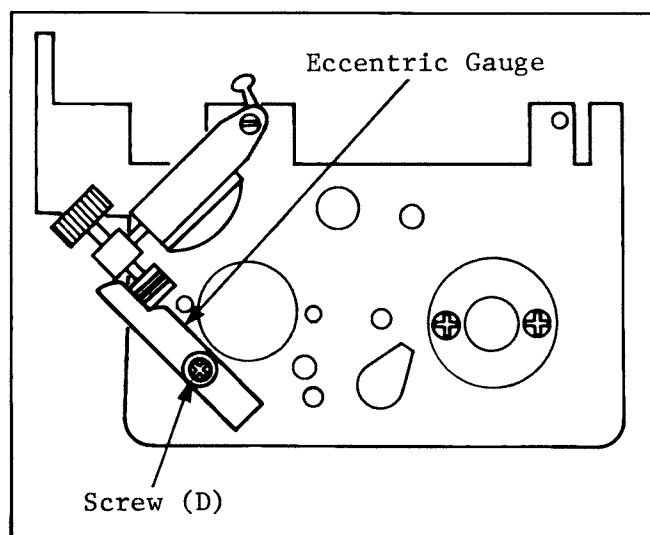


Fig. 2-4. Setting of the Eccentric Gauge

6. Set the Reel Height Adjustment Plate by two setting pins.

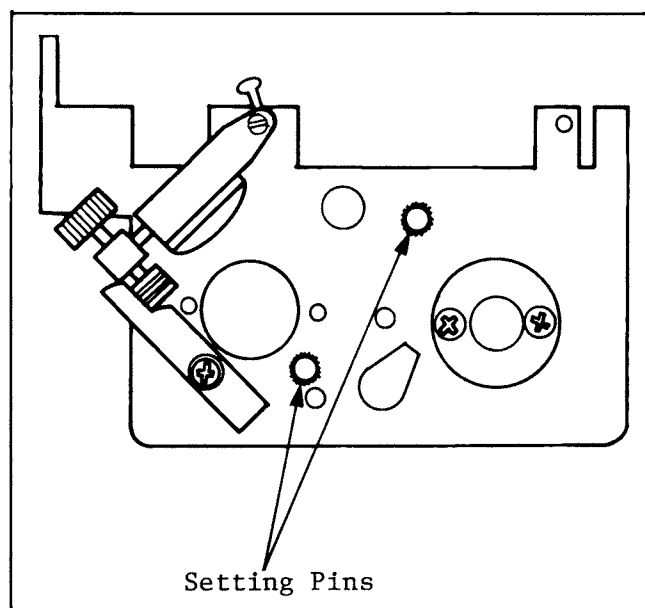


Fig. 2-5. Setting of the Setting Pins

7. Set the Eccentric Gauge as shown in Fig. 2-6.

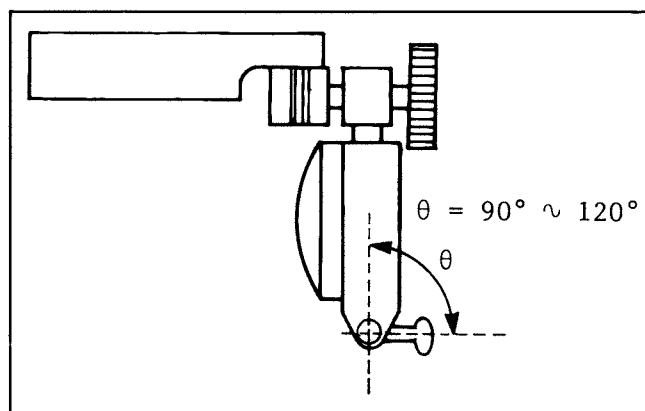


Fig. 2-6. Setting of the Eccentric Gauge

8. Set the measurement pin between line 2 and line 3 or line 3 and line 4.

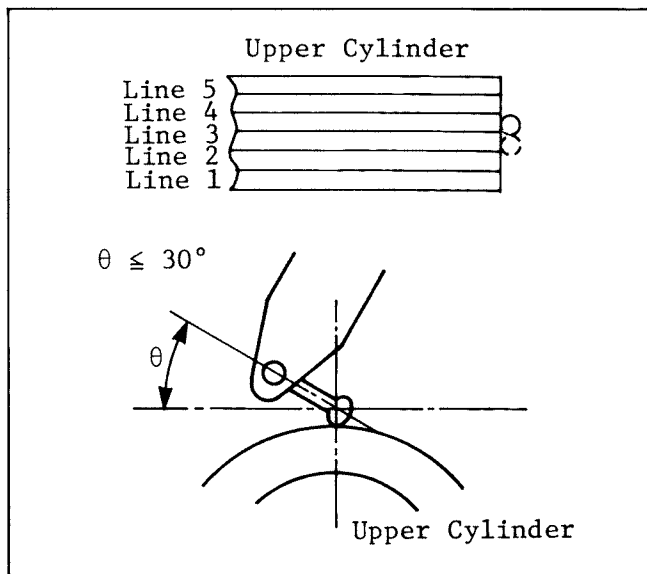


Fig. 2-7. Setting Place of the Eccentric Gauge

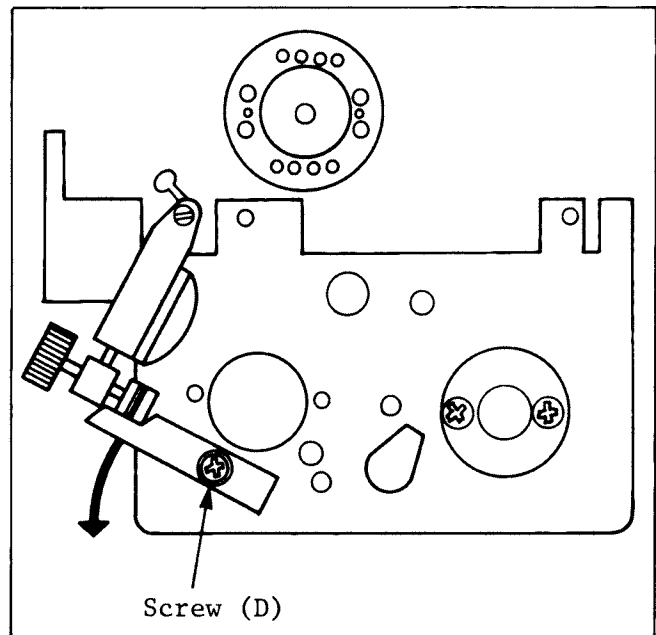


Fig. 2-9. Removal of the Eccentric Gauge

10. Remove the screw (E), and remove the brush unit.

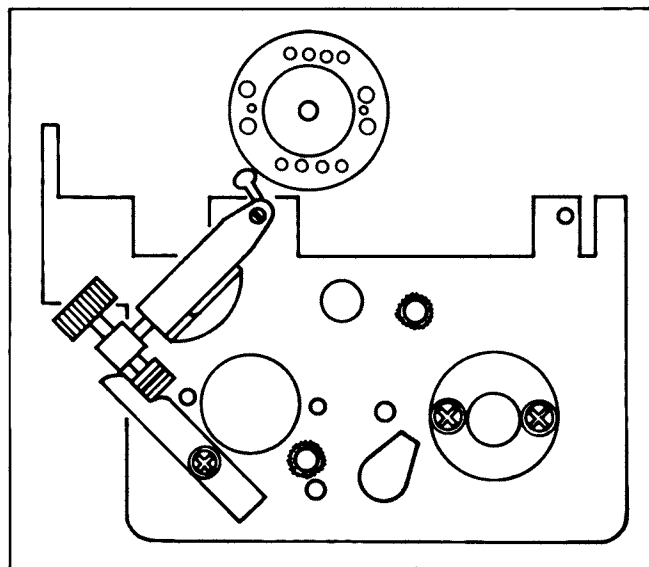


Fig. 2-8. Setting Condition

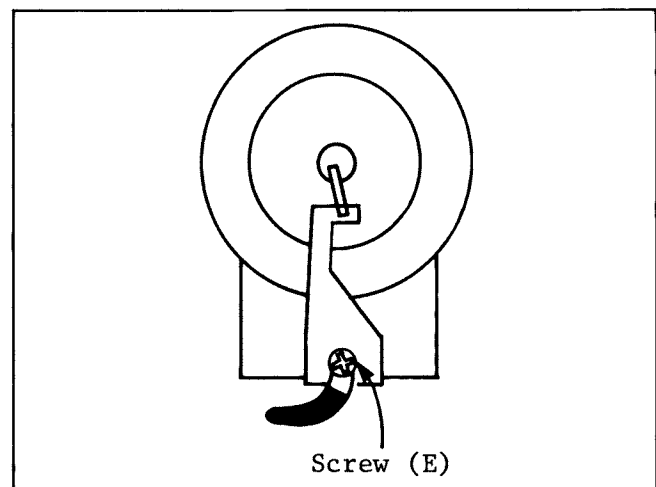


Fig. 2-10. Removal of the Brush

11. Unsolder the 8 wires and remove the 2 screws (F). Remove the old upper cylinder.

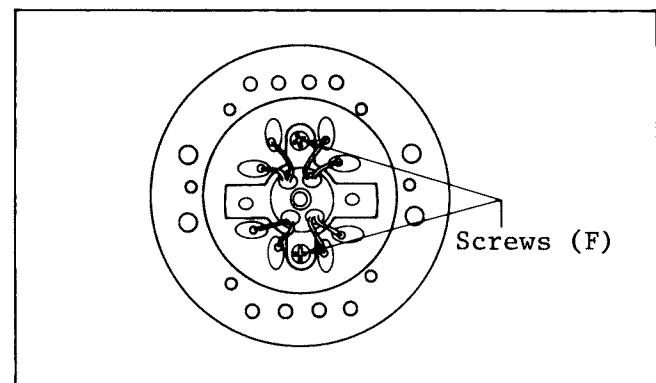


Fig. 2-11. Removal of the Wires

9. Loosen the screw (D), and detach the measurement pin.

12. Set the new upper drum. Then tighten the screw (F) tentatively.
13. Solder the 8 wires.

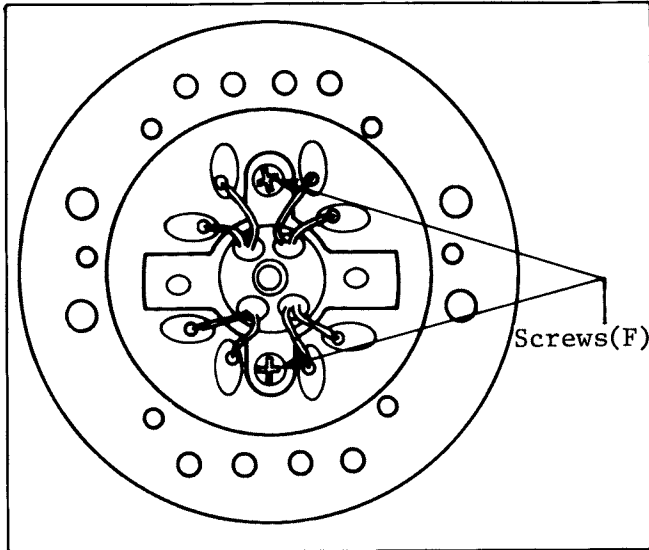


Fig. 2-12. Replacement of Upper Drum

14. Clean the measurement pin of Eccentric Gauge and the new upper drum.
15. Set the dial gauge unit, and tighten the screw (D).

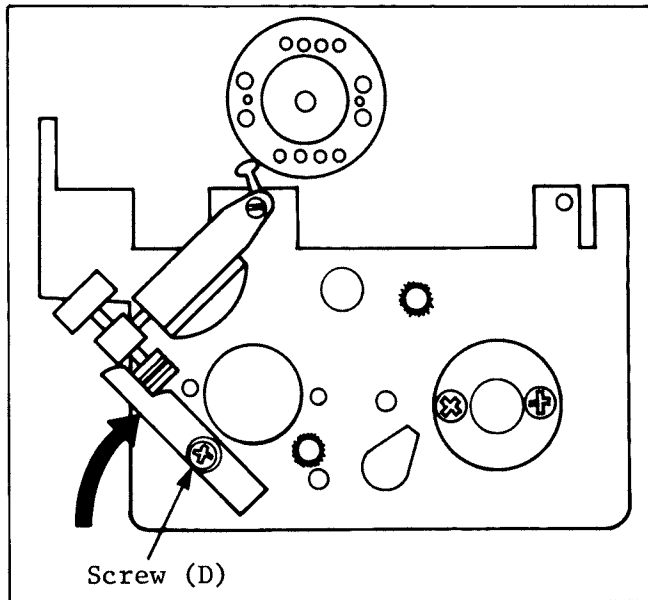


Fig. 2-13. Measurement

16. Adjust the off-center volume of the new upper drum within $\pm 1.5\mu\text{m}$.

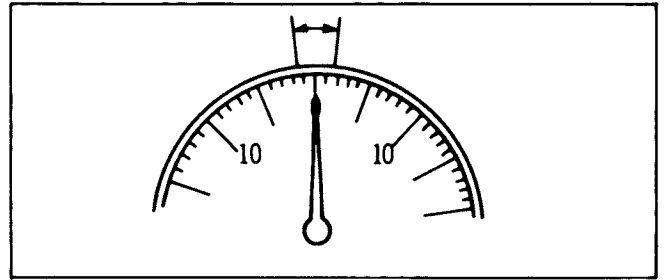


Fig. 2-14. Adjustment of the Off-Center Volume

17. Tighten the screws (G).

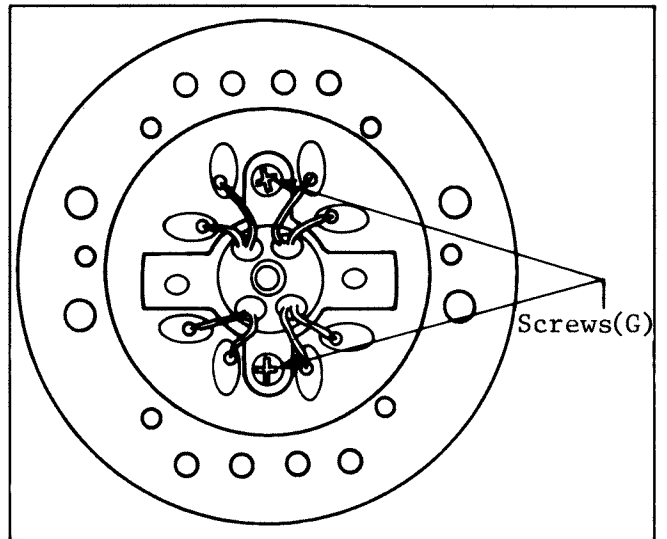


Fig. 2-15. Tightening of the Screws

18. Confirm the off-center volume of the new upper drum.

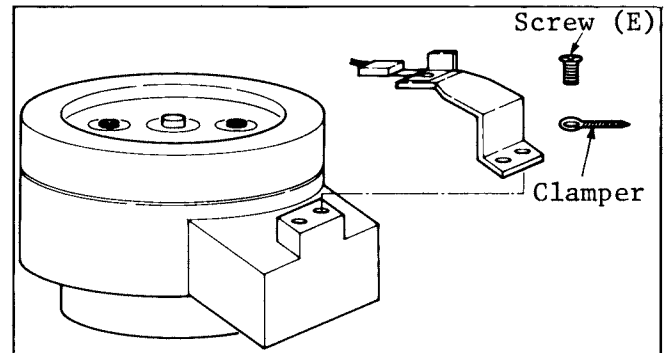


Fig. 2-16. Setting of the Brush Unit (1)

19. Set the brush unit and tighten the screw (E).

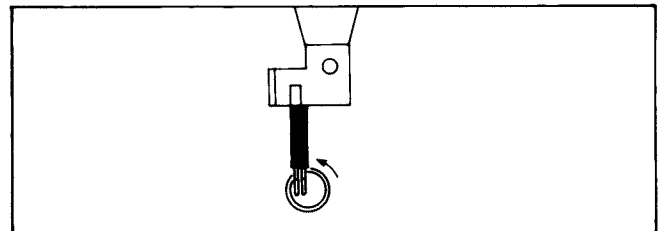


Fig. 2-17. Setting of the Brush Unit (2)

3. ADJUSTMENT OF MODE SELECT SWITCH & AUTO BACK SWITCH

- * Tools Required:
Gear Driver
Tension Arm Fixture

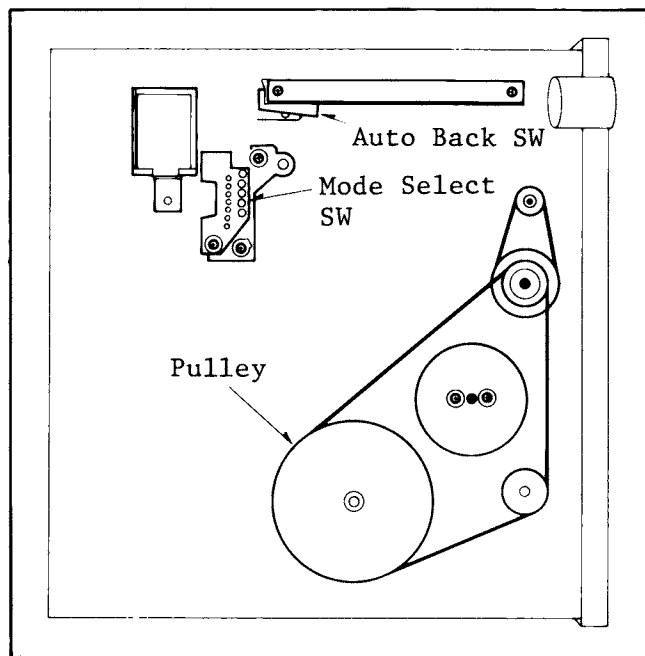


Fig. 3-1. Viewing From Right View

1. Remove the P.C. Boards (VIDEO PROCESSOR P.C.B. and the SERVO SYSTEM CONTROL P.C.B.)
2. Turn pulley clockwise slowly (viewing from right side) by hand until the main lever fix in unloading completion condition. While turning pulley, do not supply excessive force.
3. Slightly loosen the 2 screws (A) and insert the Tension Arm Fixture into hole (B).
4. Adjust the MODE SELECT switch so that the V-shaped notch of the switch meets the tab on the main lever. Then tighten the 2 screws (A).

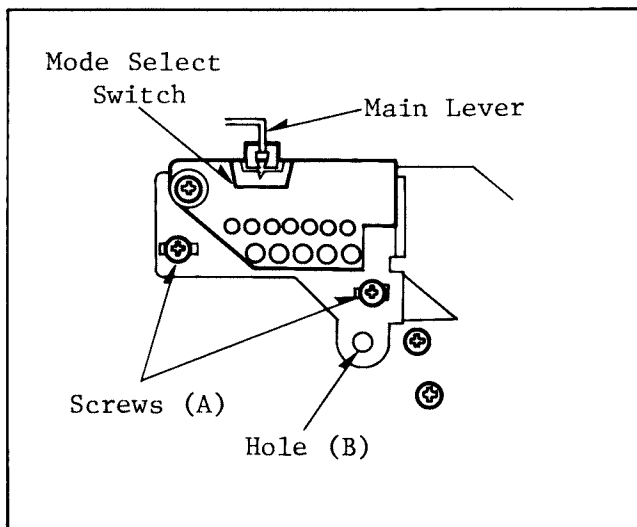


Fig. 3-2. Adjustment of Mode Select SW.

5. Turn pulley counterclockwise slowly (viewing from right side) by hand until the REV mode. Main Lever stops at the REV mode.

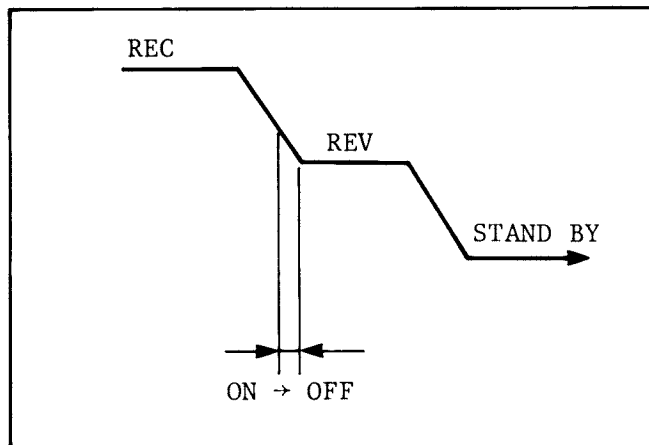


Fig. 3-3. REV Mode

6. Slightly loosen the screw (C) and insert the gear driver into hole (D).
7. Adjust the AUTO BACK switch so that the switch just turns OPEN. Then tighten the screw (C).

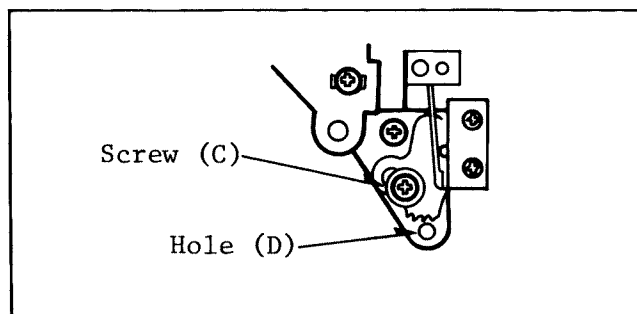


Fig. 3-4. Adjustment of Auto Back SW.

4. POSITION ADJUSTMENT OF SOLENOID

Tool Required:
Tension Arm Fixture

Specification:

Clearance between the Idler Lever and
the Idler Arm in REWIND mode.....
... $0.4\text{mm} \pm 0.1\text{mm}$

1. Remove the SERVO SYSTEM CONTROL P.C.B. (P-2) and the VIDEO PROCESS P.B.C. (P-1) and connect the extension cable between P-2 and the VTR.
2. Remove the AUDIO P.C.B. (P-3) unit by the 7 screws (A) as shown in Fig. 4-1. Blind the supply and take-up phototransistors with two pieces of black tabs and turn the power switch ON.
Place the unit in REWIND mode without tape.

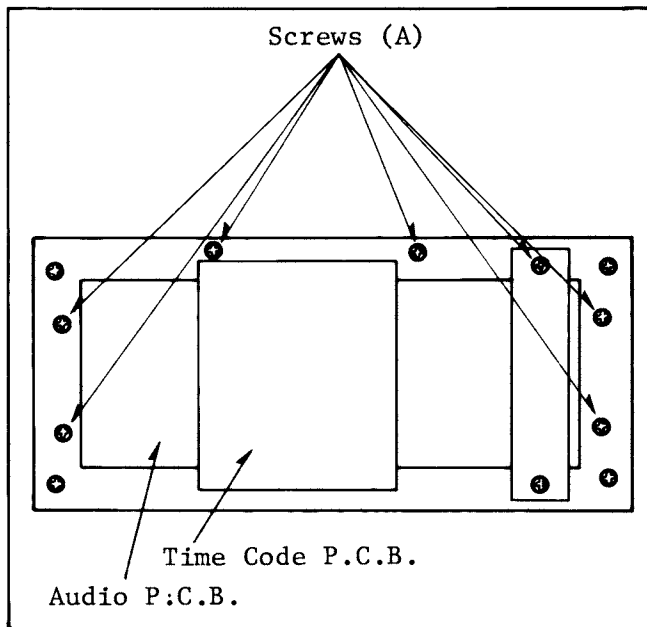


Fig. 4-1. Removal of Audio P.C.B. (P-3)

3. Loosen the 2 screws (B) and insert the Tension Arm Fixture into hole (C).
4. Adjust clearance by turning to obtain the specified clearance.
Then tighten the 2 screws (B).

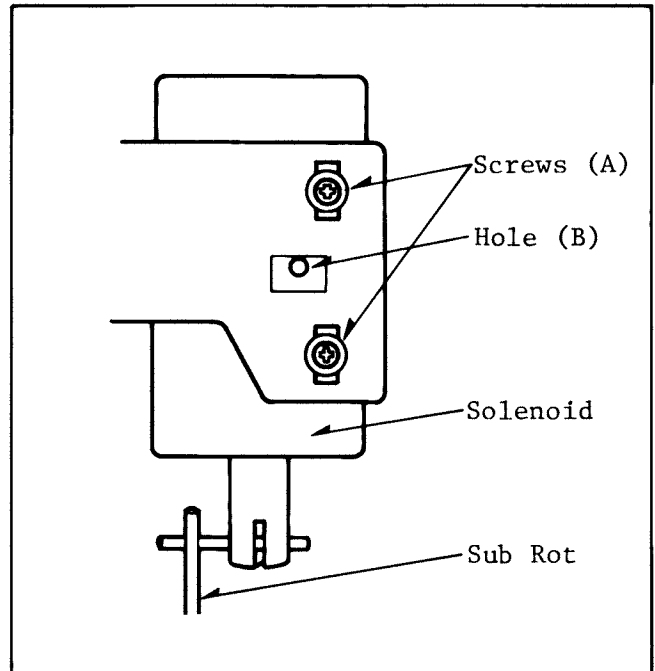


Fig. 4-2. Adjustment of Solenoid

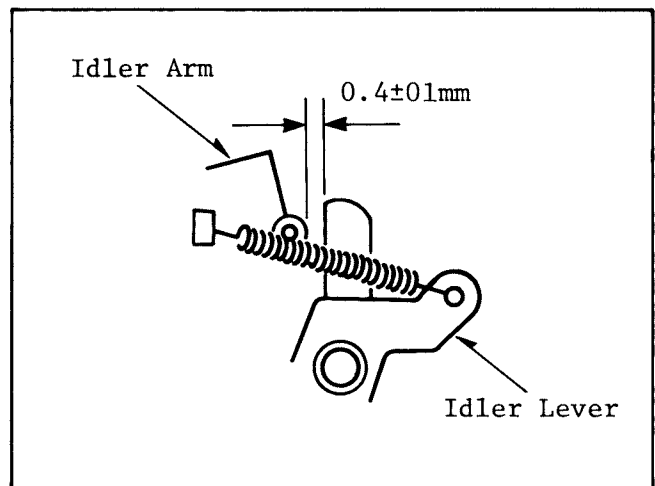


Fig. 4-3. Spec. of Clearance

5. POSITION ADJUSTMENT OF SAFETY SWITCH

This adjustment is required only when the Safety Switch was replaced or mounting screw was loosened.

Tool Required:
Cassette Holder Fixture

1. Remove the cassette compartment.
2. Place the fixture, just slightly loosen the 2 screws (A) by about half turn.

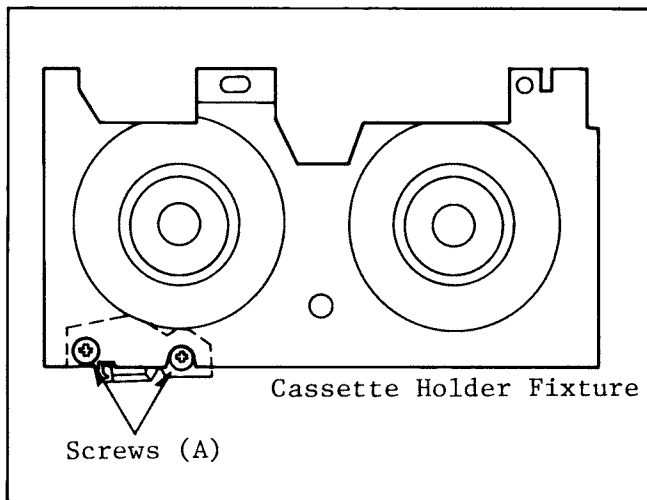


Fig. 5-1. Adjustment of Safety SW - (1)

3. Turn the switch base counterclockwise and then slowly turn clockwise until switch turns on (it clicks). Then tighten 2 screws.

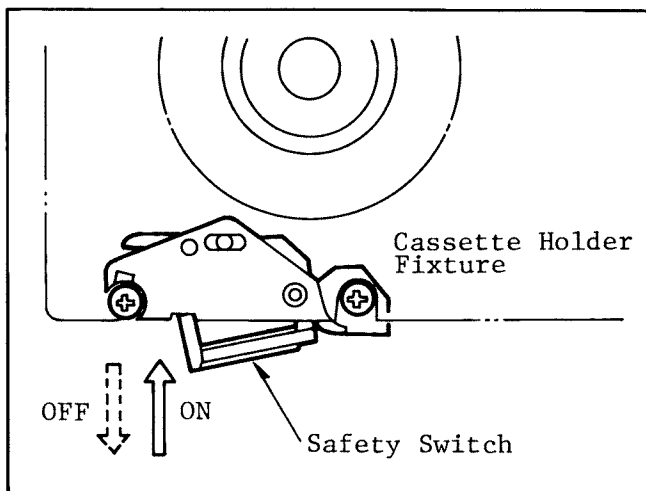


Fig. 5-2. Adjustment of Safety SW - (2)

6. CASSETTE LOCK DETECTOR SWITCH ADJUSTMENT

* Tool Required:
Gear Driver

1. Place the unit in the EJECT mode.
2. Slightly loosen the screw (A) and insert the gear driver into hole (B).

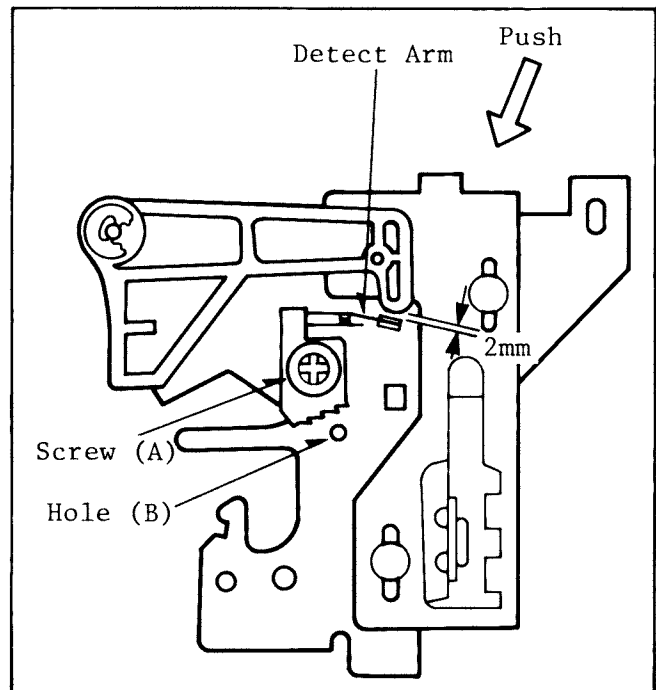


Fig. 6-1. Adjustment of Cassette Lock Detector SW.

3. Push the detect arm so that the clearance is 2mm.
4. Adjust the CASSETTE LOCK DETECTOR SWITCH so that the switch just turns CLOSED portion from OFF.

7. HEIGHT ADJUSTMENT OF REEL TABLES

* Tools Required:

Post Adjustment Plate
Reel Table Height Gauge
Retaining Ring Remover

* Specification $0.1\text{mm} \pm 0.1\text{mm}$

1. Remove the cassette compartment.
2. Place the post adjustment plate over the reels, and put the gauge on it. Set the gauge to zero "0" with the condition that scraper of gauge touches the cut-out portion of the plate.

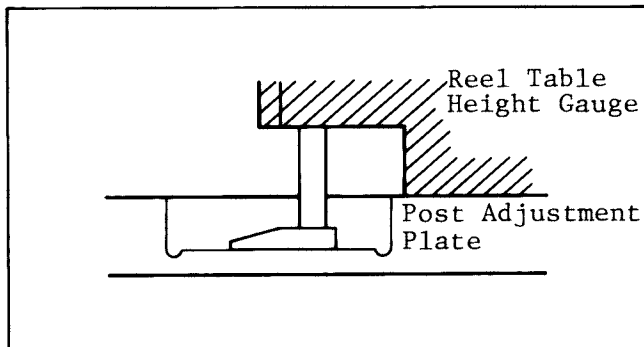


Fig. 7-1. Adj. of Reel Table Height - (1)

3. Then measure the top portion of reel table and confirm the difference against the condition just performed in former step. Do same for the other reel table.

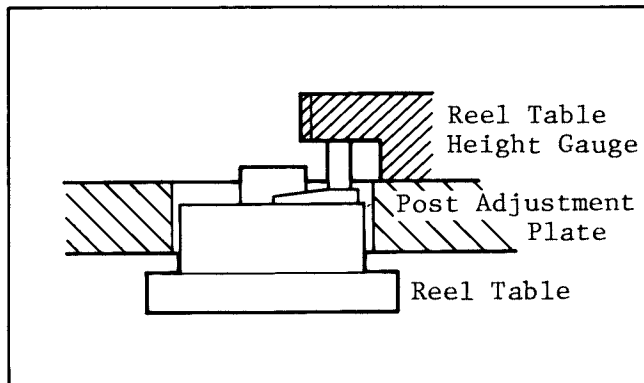


Fig. 7-2. Adj. of Reel Table Height - (2)

4. Confirm that the difference of the readings between step 2 and step 3 is within specification. If it is out of spec., then adjust the height of the reel table. (The washer is available in sizes of 0.13mm, 0.25mm and 0.5mm of thickness.)

5. To replace the washer of the take-up reel table, remove the retaining ring and take-up reel table. For maintenance of the supply reel table, remove the 2 retaining rings, tension post unit and supply reel table.

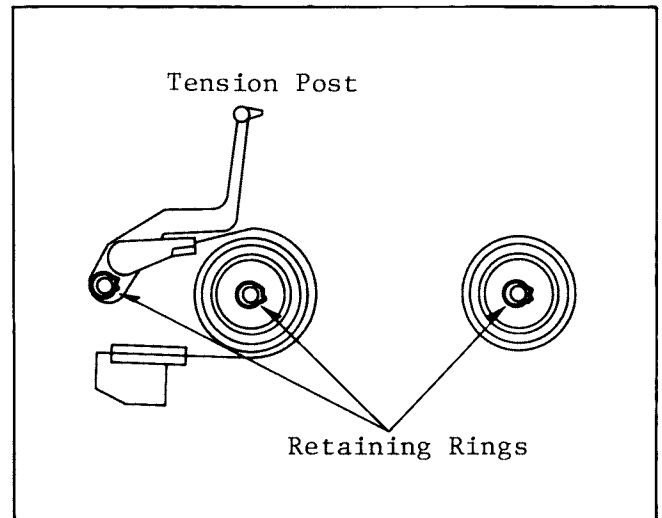


Fig. 7-3. Height Adjustment - (3)

8. CONFIRMATION/ADJUSTMENT OF BRAKE TORQUE

A. Confirmation Procedure

* Tools Required:

Dial Torque Gauge
Dial Torque Gauge Adaptor

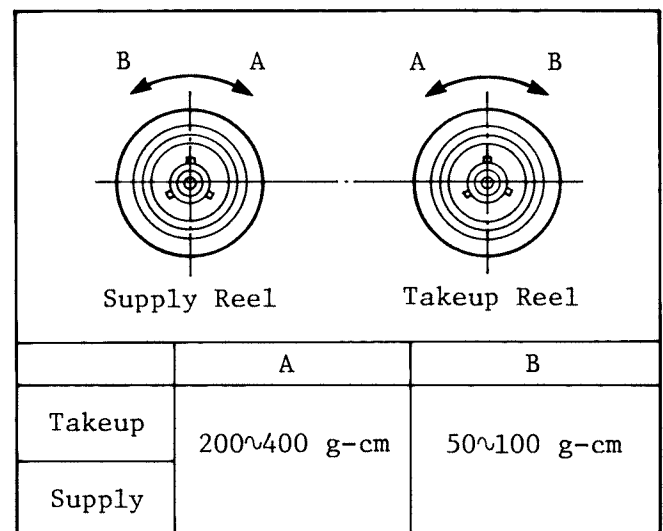


Fig. 8-1. Spec. of Brake Torque

1. Attach the adaptor to the torque gauge, and place the deck in STOP mode.

2. Place the torque gauge on the reel table.
The weight of gauge should not rest on the reel table.

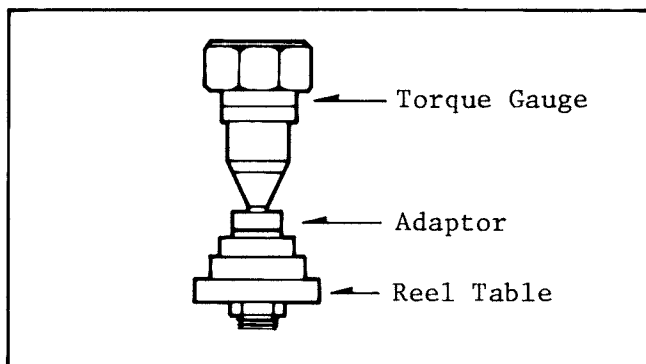


Fig. 8-2. Measuring Method

3. Turn torque gauge in the direction indicated as A or B until the brake begins slipping.
Read the torque when it begins slipping.

B. Adjustment Procedure

To adjust the brake torque, change the brake spring for new one.

Note:

If proper brake torque could not obtained by changing the spring for new one, clean the rotating surface of the reel table with a soft cloth and confirm torque.

9. POSITION ADJUSTMENT OF PRESSURE ROLLER

- * Specification:
in REV mode 0.3 - 0.7mm

1. Remove the cassette compartment.
Blind the phototransistors.
Push the eject lock lever down, turn the safety switch on by hand and push record button to simulate the REC mode.
2. Continuously turn off the REC button.
3. Confirm that the clearance A is within the specification in REV mode.
If it is out of spec., adjust it by turning screw (A) to obtain the specified clearance.

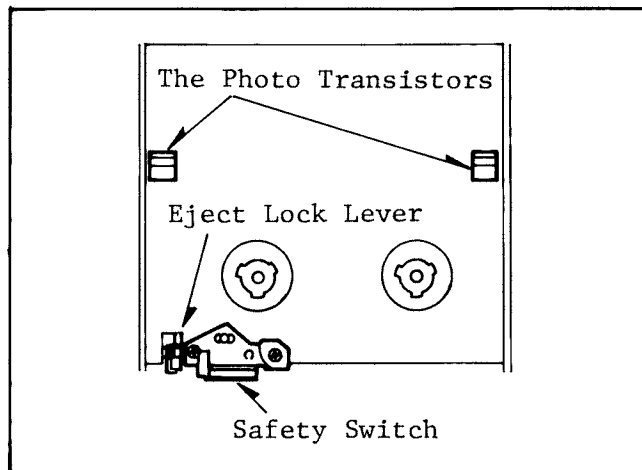


Fig. 9-1. Simulation of REC Mode

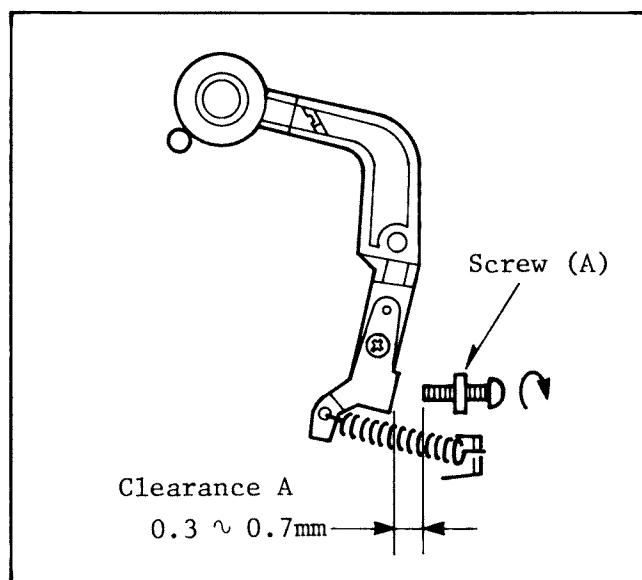


Fig. 9-2. Spec. of Clearance

4. Turn off the REC button.
5. It simulate the stand by mode.
Confirm that the clearance (B) is approx. 1mm.

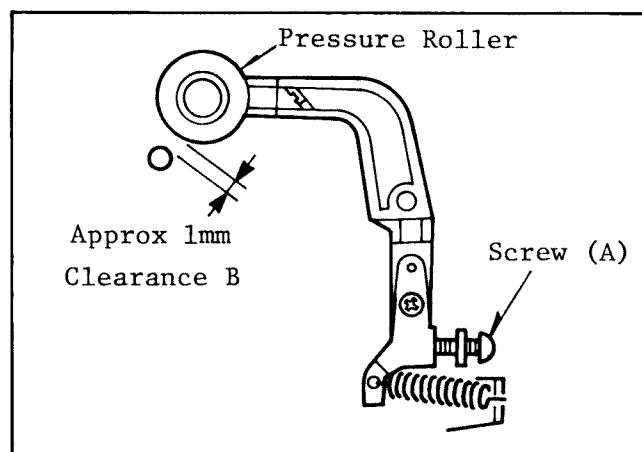


Fig. 9-3. Confirmation of the Clearance

10. POSITION ADJUSTMENT OF TENSION POST

- * Tools Required;
Tension Post Adjustment Plate
Gear Driver
- 1. Remove P.C. Boards (SERVO SYSTEM P.C.B. and VIDEO PROCESS P.C.B.) and cassette compartment.

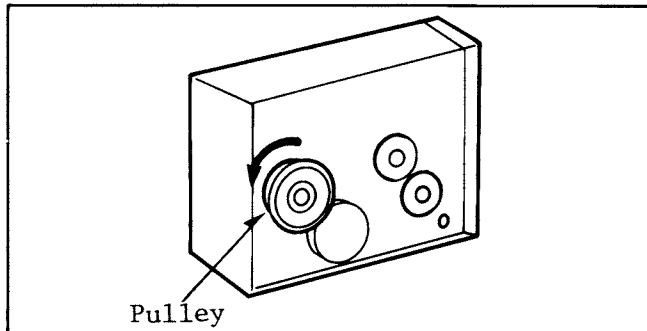


Fig. 10-1. Pulley on Right View

2. Turn pulley counterclockwise slowly (viewing from right side) by hand to simulate the REC mode.

Note:

While turning pulley, do not supply excessive force. Fifteen turns of pulley makes the Play mode (from the start, posts are just moved, to loading completion).

3. Place the adjustment plate, slightly loosen screw securing the tension band bracket.
4. Insert the fine adjustment screw-driver into the hole and move the tension band bracket in either of direction so that the tension post just touches the fixture.

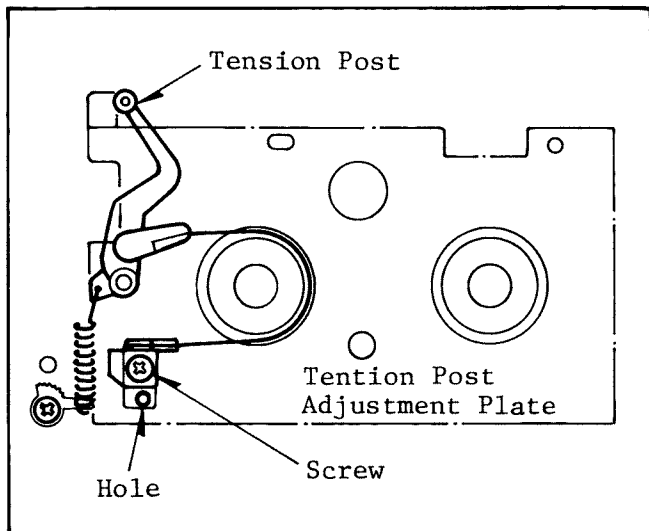


Fig. 10-2. Adjustment of Tension Post

11. MEASUREMENT ADJUSTMENT OF BACK TENSION

A. Measurement Procedure

- * Tools Required:
Back Tension Meter (Tentelometer)
Cassette Tape 120 Minutes Tape

- * Specification ... $26g \begin{matrix} + 4 \\ - 1 \end{matrix} g$

1. Remove cassette compartment.
2. Record the cassette tape from its beginning and wait until tape running has stabilized.
Insert tension meter in the tape path and confirm the value of meter. If it is out of spec., continuously perform the adjustment procedure (B).

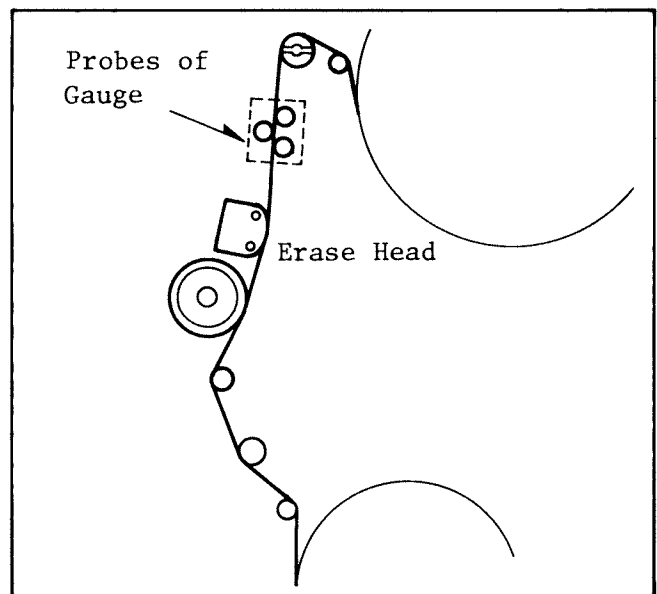


Fig. 11-1. Measurement of Back Tension

Notes:

1. Make sure that the three probes of the meter are all in good contact with tape, but out of contact with any parts while measuring.
2. It is recommended that measurements be made three times as tension meter is very sensitive.

B. Adjustment Procedure

* Equipment Required: Gear Driver

1. Loosen screw (A) and insert the gear driver into the hole (B).
2. Move the adjustment plate in either direction indicated by the arrow to obtain the specified tension.
Turn the driver clockwise to lower tension, counterclockwise to raise it.
3. Tighten the screw (A) and again verify tension with the meter.

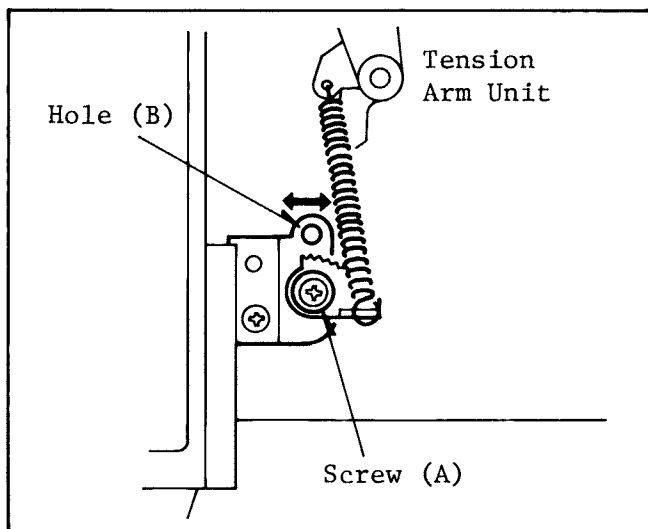


Fig. 11-2. Adjustment of Back Tension

12. HEIGHT ADJUSTMENT OF TAPE GUIDE POSTS

- * Tools Required:
Post Adjustment Plate
Post Adjustment Screwdriver
Post Height Fixture
Hex. Wrench (0.9mm)
Nut Driver
Purchase from Local Supplier

This procedure is just preliminary the "TAPE INTERCHANGEABILITY ADJUSTMENT" for the 4 tape guide posts. It does not by itself constitute the final interchangeability adjustment.

1. Place the post adjustment plate on the 4 cassette support pins correctly and put the Post Height Fixture on it.
And fit the Post Height Fixture against each post for confirmation that the post is positioned lower or higher against the adjustment plate.

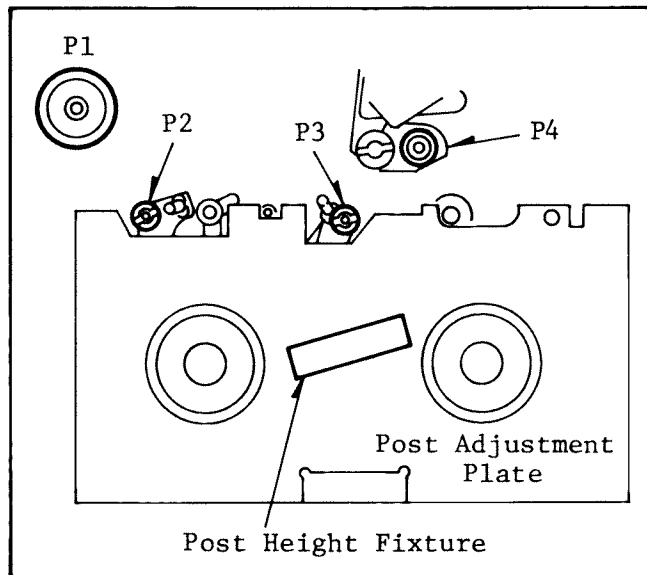


Fig. 12-1. Location of Posts

2. Loosen the locking hex. screws of posts (P2 & P3), then rotate the top of each post counterclockwise with the post adjustment screwdriver to raise it to position (C) shown below.
3. Then slightly press the block gauge against the post sleeve and rotate the top of the post clockwise with post adjustment screwdriver until post is in position (A) shown below.

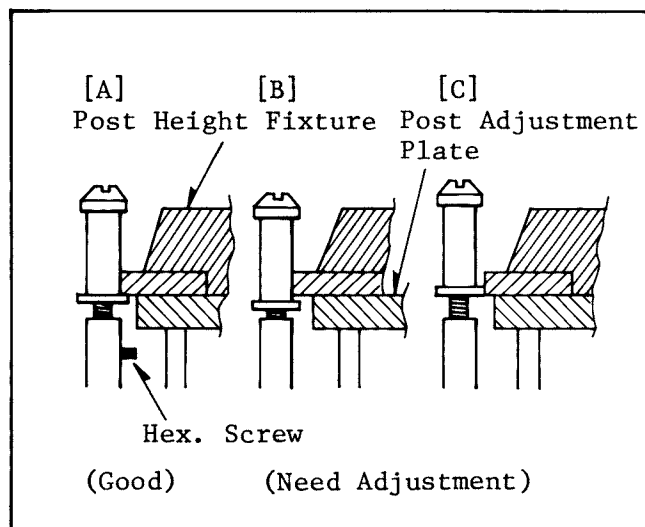


Fig. 12-2. Height Adjustment

4. Make the same adjustment for posts (P1 & P4) with nut driver.
(Remove the post cap for P4 by turning it counterclockwise).

Note:

When the post cap is reinstalled, the direction of it should be as shown below viewing from the direction indicated by the arrow.

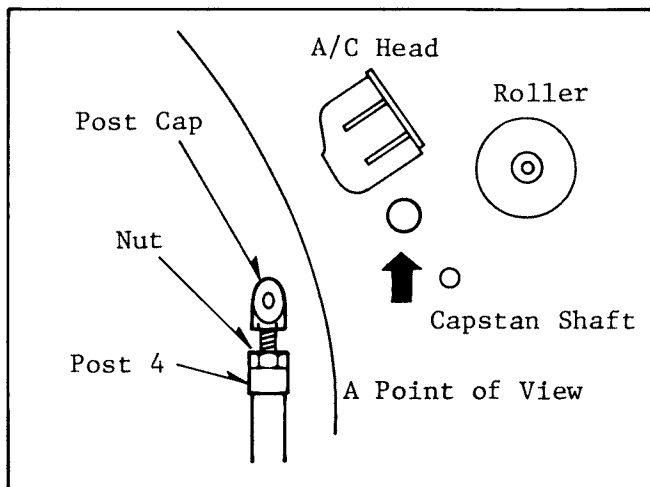


Fig. 12-3. Installation of Post Cap

13. HEIGHT ADJUSTMENT OF PULL OUT POST

Notes:

1. The adjustment should be performed after the adjustment of P4 as the spec. is based on height of P4.
2. The adjustment should be performed in the loading completion mode.
3. Unless the replacement or adjustment of this post is completed, turn the power switch OFF.

*** Tools Required:**

Post Adjustment Plate
Reel Table Height Gauge
Nut Driver Purchase Locally

*** Specification** $0.02\text{mm} \pm 0.01\text{mm}$

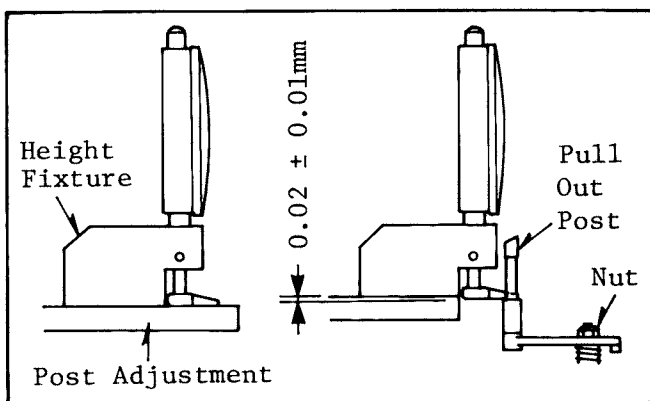


Fig. 13-1. Adj. of Pull Out Post

1. Remove the cassette compartment.
2. Turn power switch ON. Cover the take-up and supply phototransistors with black tape, push the eject lock lever down. Turn the safety switch ON by hand and push the record button to simulate the REC mode for loading.
3. As soon as loading is completed, turn the power switch OFF.
4. Place the adjustment plate on the transport. Put the height fixture on the plate and set dial gauge to zero "0" with the scraper touching the plate.
5. First, slightly lower the post by turning the nut clockwise. Fit the scraper to the post as shown below.

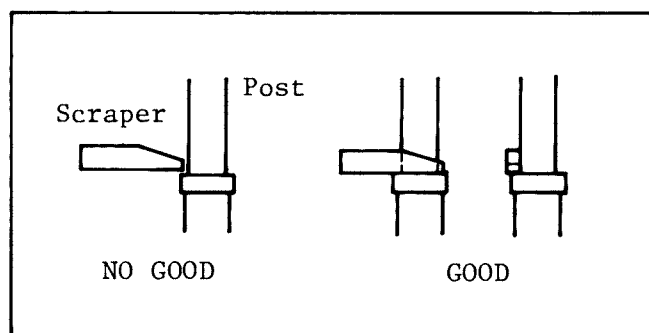


Fig. 13-2. Adj. of Guide Post Height

6. Then slowly turn the nut till the gauge reads specified height.
7. Remove the black tape from the phototransistors before reinstalling the cassette compartment.

14. POSITION ADJUSTMENT OF PHOTO ENCODER

* Tools Required:
Gear Driver
Oscilloscope (Dual Trace)

1. Remove the cassette compartment.
Blind the supply and take-up photo-transistors with two pieces of black tape and turn the power switch ON.
2. Connect the scope CH1 to TP15, CH2 to TP16 both on the SERVO SYSTEM CONTROL P.C.B. (P-2).
Set the scope in CHOP mode.
Push the eject lock lever down and place the unit in FF mode without tape.
3. Slightly loosen the screw (A) and insert the gear driver into hole (B).
4. Adjust the PHOTO ENCODER so that the two waveforms become as shown in Fig. 14-2.
Then tighten the screw (A).

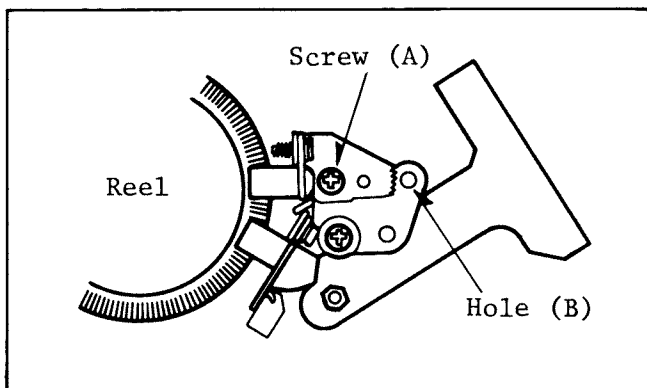


Fig. 14-1. Adjustment Procedure

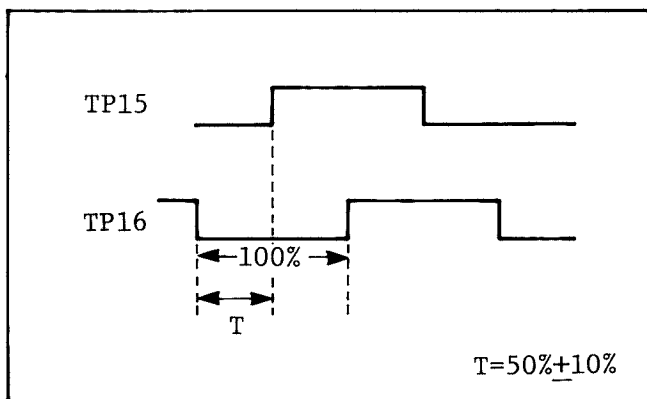


Fig. 14-2. Adjustment of Photo Encoder

15. ADJUSTMENT OF CASSETTE HOLDER & GUIDE

This adjustment is required only when the screw (A) was removed accidentally.

* Tools Required:
Cassette Holder Fixture

Note:

Before adjustment, ensure the cassette lock lever is unlatched.

1. Remove the cassette guide and slightly loosen 6 screws (A) and (B).
Keep the cassette holder in ejected condition.
2. Insert the fixture and push at all the way in till it touches the tabs on the cassette holder.
Hold the fixture and cassette holder together with your hand, then slowly lower them while watching all holes and cut-outs till the cassette holder latches.

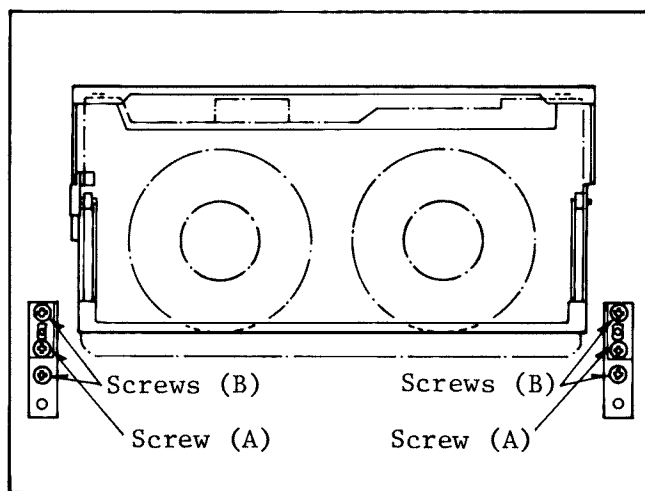


Fig. 15-1. Adjustment of Cassette Holder

3. Press the center portion of the fixture down to prevent losing the adjusted position. Then tighten 6 screws.
4. Supply power and ensure smooth movement by repeatedly pressing down and ejecting the cassette holder.
5. Reinstall the cassette guide. Insert the cassette tape and make sure that the clearance between tape and projections on cassette guide is more than 1mm.
Then tighten 2 screws (D).

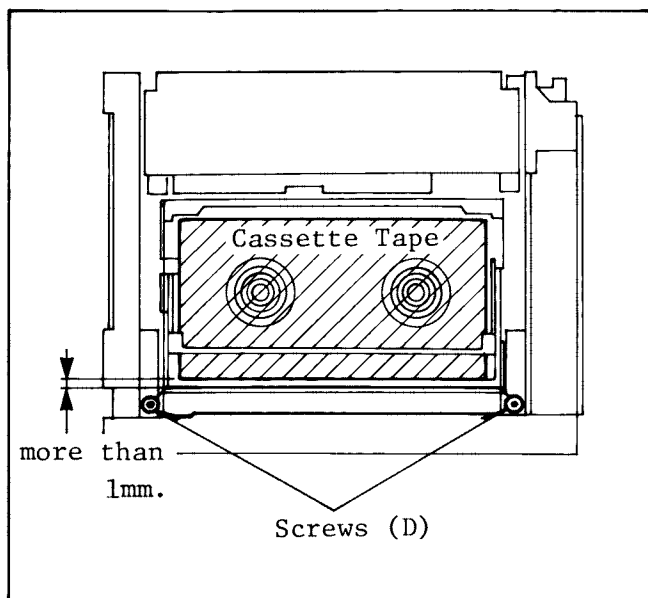


Fig. 15-2. Adjustment of Cassette Guide

16. CASSETTE HOLDER BOSS ADJUSTMENT

1. Remove the cassette compartment
2. Remove the 2 screws (A) and set the Reel Height Adjustment Plate by two setting pins tentatively. The 2 screws (A) are shown in Fig. 15-1.
3. Loosen the hex. screw (B).
4. Set the Reel Height Adjustment Plate tightly.
5. Tighten the hex. screw (B).

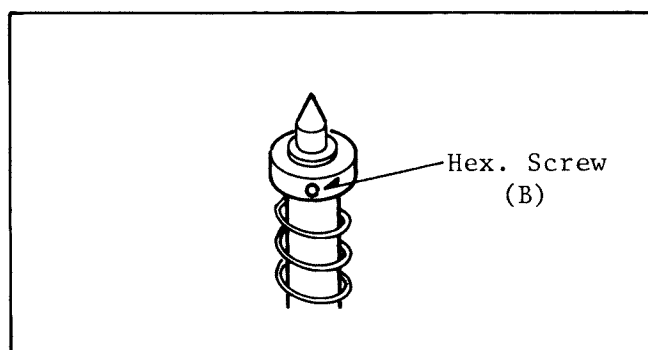


Fig. 16-1. Cassette Holder Boss

17. CONFIRMATION OF PRESSURE ROLLER FORCE

* Tool Required:
Fan-Type Tension Gauge

* Specification $1,750g \pm 350g$

1. Insert a cassette and make a recording.
2. Set a fan-type tension gauge against port (P) of pressure arm unit.
3. Push against the lever with gauge, in the direction indicated by the arrow.
4. Confirm that the tension gauge reading is $1,750g \pm 350g$ at the moment that tape stops.
5. If proper pressure roller force could not be obtained, change the spring (A).

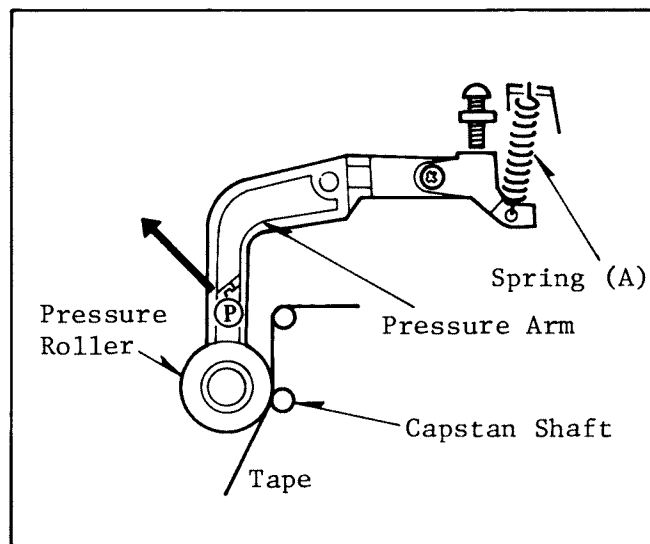


Fig. 17-1. Confirmation of Pressure Roller Force

18. TAPE INTERCHANGEABILITY ADJUSTMENT

- * Tools Required:
- Alignment Tape
 - Cassette Holder Fixture
 - Post Adjustment Screwdriver
 - H-Position Adjustment Fixture
 - Hex. Wrench (0.9mm)
 - Hex. Wrench (1.5mm)
 - Plus Driver
 - Oscilloscope
 - Nut Driver
- Purchase from Local Supplier

18-A. CONFIRMATION OF TAPE TRAVEL

To prevent the alignment tape from being damaged, use a normal cassette tape for confirmation.

1. Record a cassette tape and confirm that the tape travels without curling at the edges of the tape.

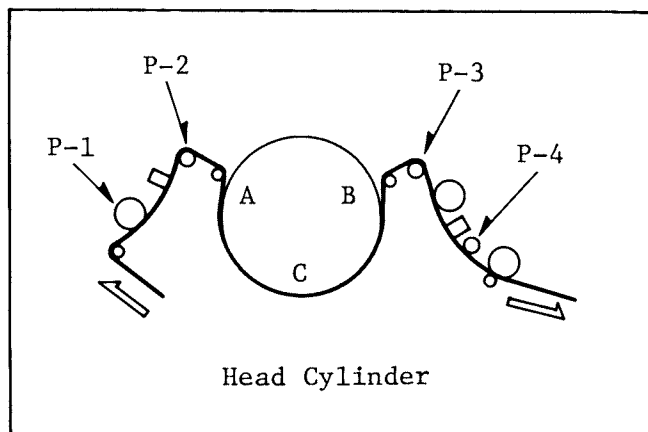


Fig. 18-1. Location of Posts

2. If curling is apparent, adjust the height of posts by turning the top of post with the post adjustment screwdriver (for P2 & P3) or nut driver (for P1 & P4).

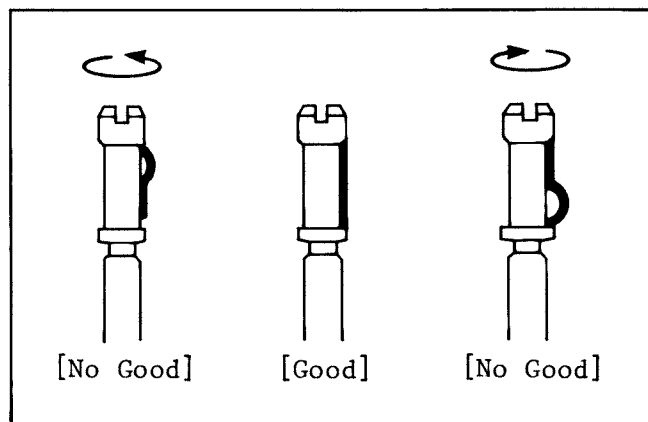
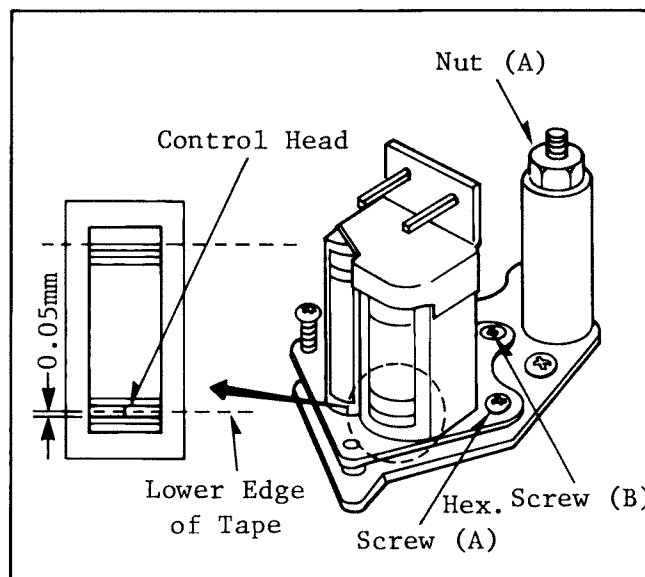


Fig. 18-2. Height Adjustment

18-B. CONFIRMATION OF A/C HEAD HEIGHT

This confirmation is required when the A/C head was replaced and to adjust the height of it preliminary. For final adjustment, perform next item 18-C.

1. Looking at the lower edge of the control head with the tape running, ensure that the lower edge of tape runs along the lower edge of the control head.
2. If it doesn't slightly turn the nut (C) in either directions to correct it.
Turn it clockwise to lower the head, counterclockwise to raise it.



18-C. CONFIRMATION OF TILT OF A/C HEAD

This procedure should be confirmed after the height adjustment of P4.

1. Record a tape and confirmed the tape runs between lower and top limiters of post, also confirm the condition of tape running.
2. If waving or frilling is apparent on the lower or top edge of the tape, adjust by turning hex screw (B) located on the A/C head base.
(See Fig. 18-4)

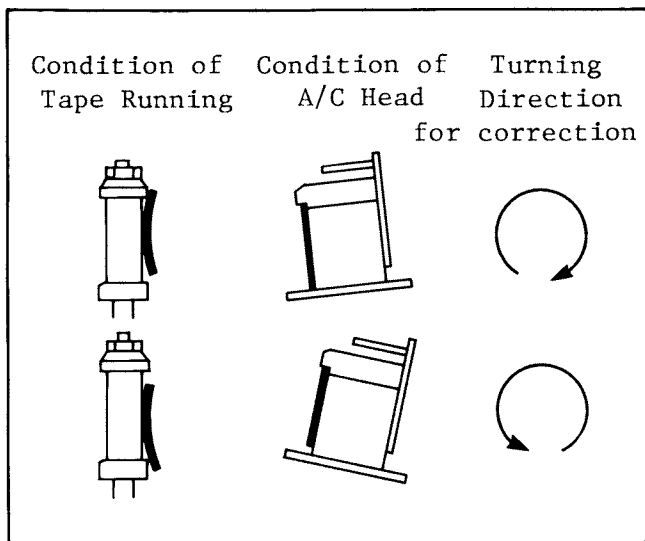


Fig. 18-4. A/C Head Adjustment

Note:

If adjustment cannot complete, adjust Pull Out Post as follows. Correct waving and frilling by turning Screw (D) or Screw (E) with Plus Driver.

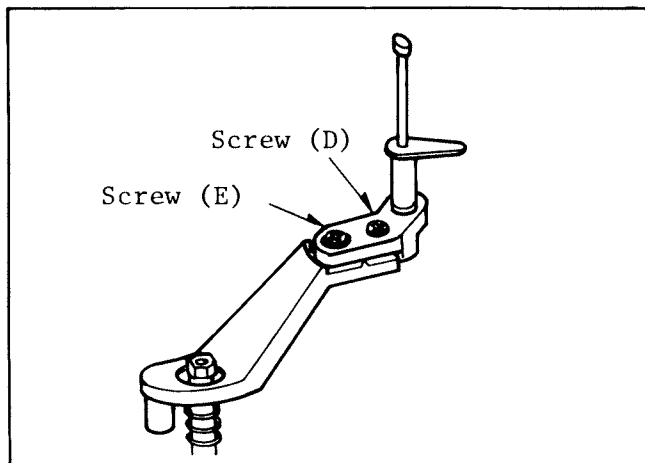


Fig. 18-5. Adjustment of Pull Out Post

18-D. HEIGHT & AZIMUTH ADJUSTMENT OF A/C HEAD (USE STUDIO VTR)

1. Remove the cassette compartment.
2. Connect the Inter Connection Cable to audio head connector P41 on the AUDIO C.B.A. (PORTABLE VTR).
3. Remove the AUDIO AMPLIFIER C.B.A. (SL-15) (STUDIO VTR). Insert extension board in place of the AUDIO AMPLIFIER C.B.A. then insert the AUDIO AMPLIFIER C.B.A.

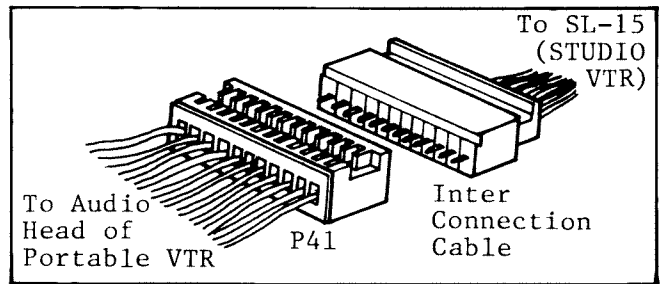


Fig. 18-6. Connection of Audio Head (Connector P41 and Inter Connection Cable)

4. Connect the red pin (and red lead wire) of the Inter Connection Cable to A,B-28 on the AUDIO AMPLIFIER C.B.A., the white pin (and white lead wire) to A,B-29, the green pin (and green lead wire) to A,B-37, and the black pin (and black lead wire) to A,B-38.
5. Connect GND jumper between Portable VTR and Studio VTR.
6. Connect scope CH1 to TP5 and CH2 to TP11 on the AUDIO AMPLIFIER C.B.A.
7. Turn the power switch on. (Studio VTR). And insert the Cassette Holder Fixture and playback it.
8. Turn the power switch on. (Portable VTR). And insert the Alignment Tape and playback the 6kHz audio portion.
9. Adjust the screws (A) and the nut (C) so that the waveforms have the same phase and maximum amplitude.
10. If waving of frilling is apparent on the lower or top edge of the tape, repeat 18-C.

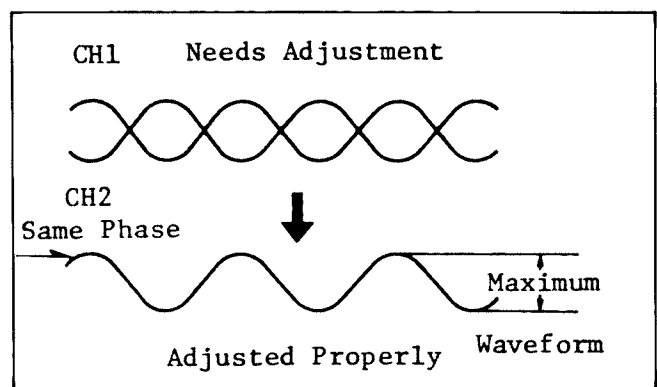


Fig. 18-7. Adjustment of Height & Azimuth

11. After the adjustment, unsolder the wires of Audio Head CH1 and CH2 of Portable and Studio VTR.

18-E. CONFIRMATION/ADJUSTMENT OF ENVELOPE OUTPUT

1. Remove the Connector P705 (Y HEAD AMP P.C.B.) and P702 (HEAD CONNECTION P.C.B.), and connect P702 in exchange for P705.
2. Connect the scope CH1 to TP6 of Y HEAD AMP P.C.B. and CH2 to TP7 of Y HEAD AMP P.C.B.
3. Turn the power switch ON, and insert the Alignment Tape and play back it.
4. Adjust the posts P2 and P3 by watching the scope display so that the envelope figure become as flat as possible.
($V1/V, V3/V \geq 0.95$ and $V2/V \geq 0.95$)

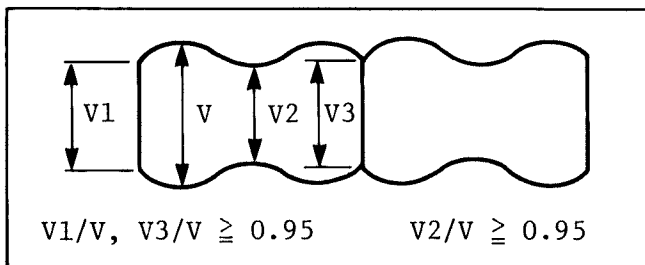


Fig. 18-8. Envelope Figure - (1)

5. When the scope display is as follows, adjust the height of P2 shown below.

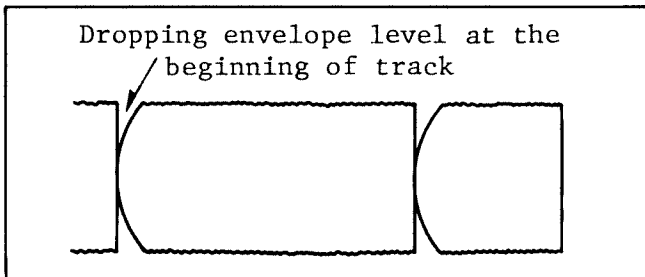


Fig. 18-9. Envelope Figure - (2)

6. When the scope display is as follows, adjust the height of P3 shown below.

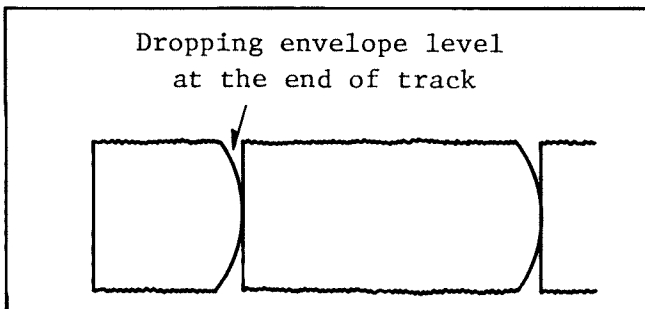


Fig. 18-10. Envelope Figure - (3)

11. The scope display with P2 and P3 adjusted correctly should become as shown below.

7. The scope display with P2 and P3 adjusted correctly should become as shown below.

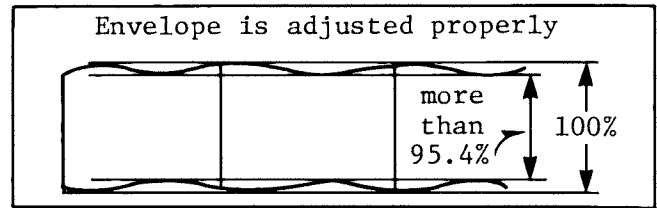


Fig. 18-11. Envelope Figure - (4)

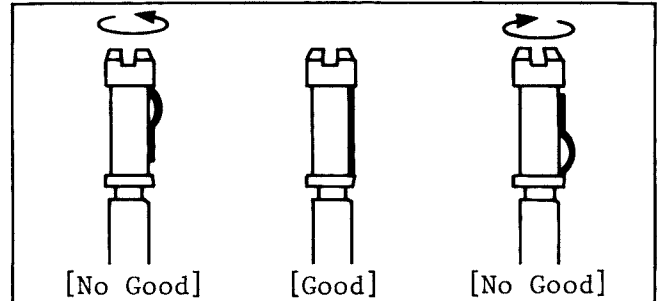


Fig. 18-12. Height Adjustment

8. When the adjustment is required, turn the top of post with the Post Adjustment Screwdriver.

18-F. HORIZONTAL POSITION ADJUSTMENT OF A/C HEAD (USE STUDIO VTR)

1. Remove the Connector P705 (Y HEAD AMP P.C.B.) and P702 (HEAD CONNECTION P.C.B.), and connect P702 in exchange for P705.
2. Connect the scope CH1 to TP6 of Y HEAD AMP P.C.B. and CH2 to TP7 of Y HEAD AMP P.C.B.
3. Turn the power switch ON and insert the Cassette Tape.
4. Record the Tape and play back the portion of it, and adjust VR9 of SERVO P.C.B. so that the envelope is maximum.
5. Secondly insert the Alignment Tape and playback it.
6. If the adjustment is required, set the H-Position Adjustment Fixture into the slot of adjustment nut and rotate in either of direction to obtain the maximum envelope output.

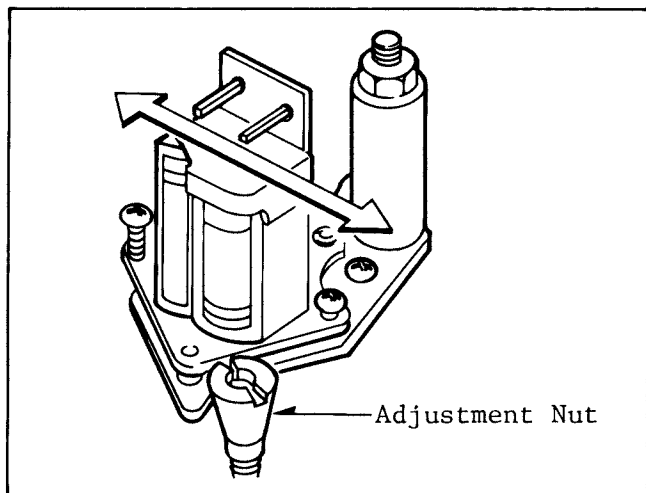


Fig. 18-13. Adjustment Procedure

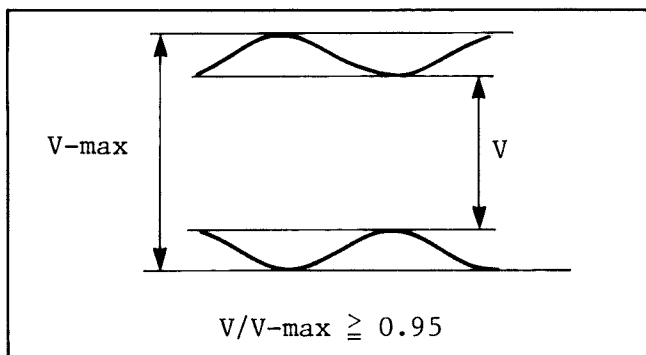


Fig. 18-14. Adjustment of Horizontal Position of A/C Head

Note:

If tape does not interchange in spite of flat envelop, adjust as follows.

1. Loosen the 2 screws.
2. Connect scope to TP12 (HOT) and TP16 (GND) on the HEAD AMP C.B.A.
3. Play back the linear standard portion of alignment tape.
4. Insert the minus screwdriver at A portion and rotate in either direction to obtain the max. envelope output.
5. Tighten the 2 screws.
6. Then adjust 18-F.

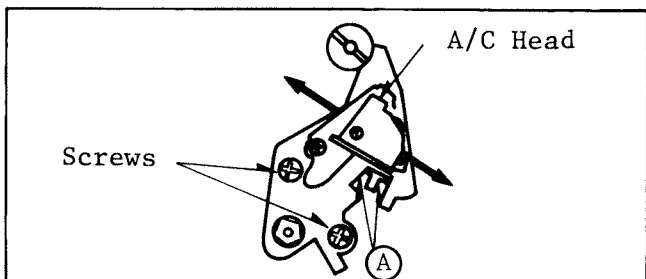


Fig. 18-15. Adjustment of A/C Head

19. CONFIRMATION OF TAPE SPEED

Equipment Required:

Frequency Counter

Alignment Tape

Specification 1,600.00 $\pm$ 4.8Hz

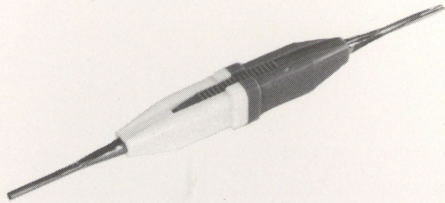
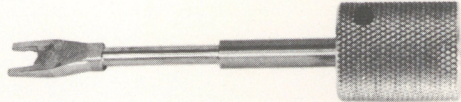
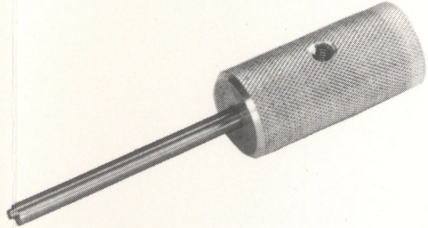
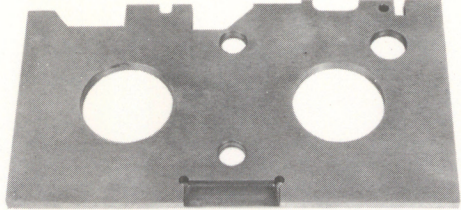
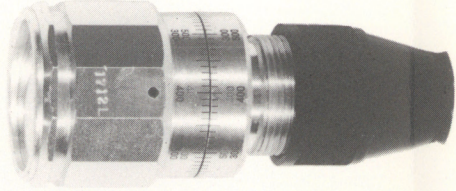
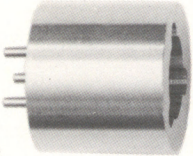
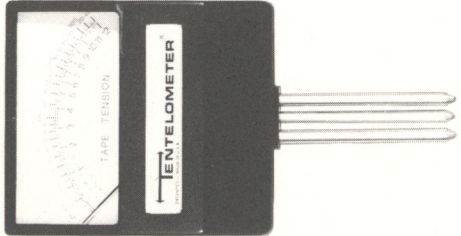
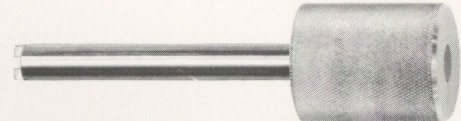
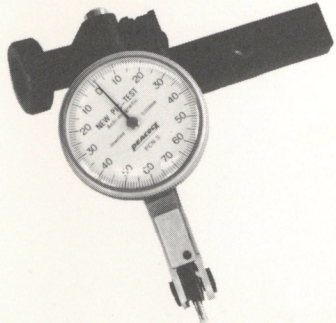
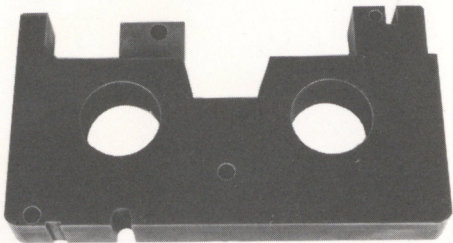
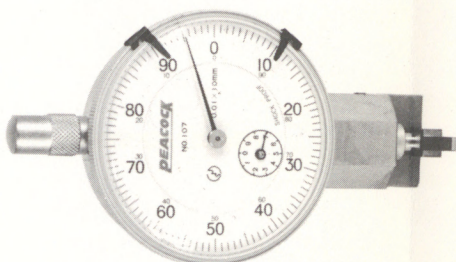
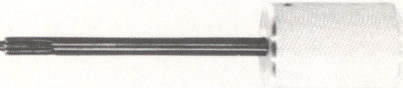
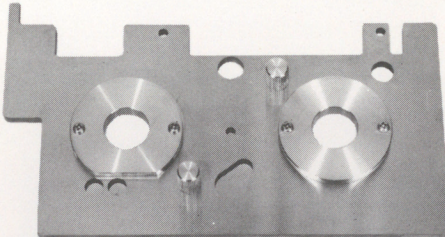
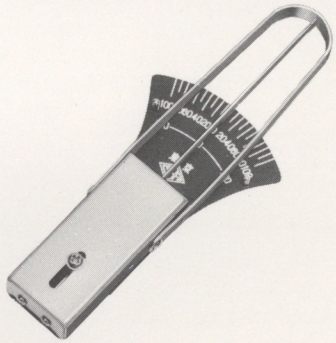
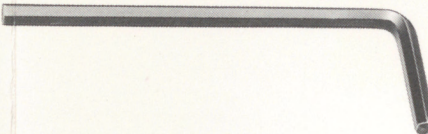
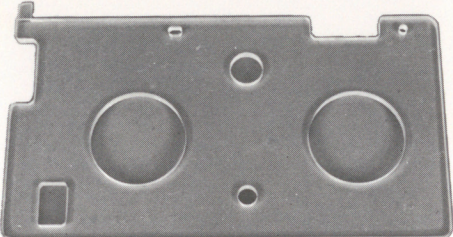
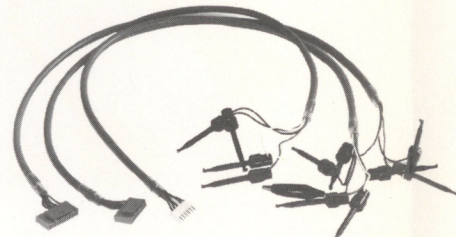
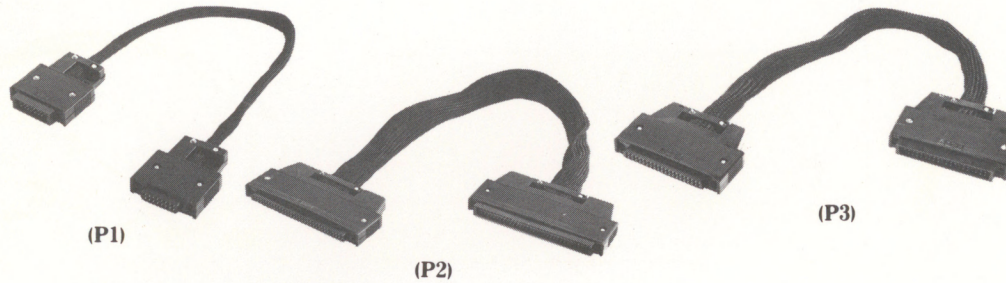
1. Connect frequency counter to TP31 on the SERVO/SYSTEM CONTROL P.C.B.
2. Record the color bar section of alignment tape and wait until tape movement is well stabilized.
3. Read the frequency counter and confirm it is within the specification.
4. If it is out of spec., since three different capstan shaft pulleys are available, use appropriate pulley to obtain specified tape speed, as shown in Fig. 19-1.

Rank	Frequency	
L	↑ Higher	↓ Lower
M		
H		

Fig. 19-1. Kind of Pulley

5. When to replace the capstan shaft pulley, first remove the capstan belt and the 2 screws.
6. Then remove the capstan shaft pulley and install the appropriate pulley.
7. Upon completion of confirmation, remove the jumper wire.

Servicing Fixture & Tools for Model AU-100

 VFK0230 Connector Pin Remover	 VFKS0003 H-Position Adjustment Fixture	 VFK0231 Tension Arm Fixture	 VFKS0010 Post Adjustment Plate	 VFK0133 Dial Torque Gauge	 VFK0134 Adaptor for VFK0133	 Back Tension Meter
 VFK0227 Post Height Fixture	 VFK0137 Post Adjustment Screwdriver	 VFK0242 Eccentric Gauge	 VFKS0004 Cassette Holder Fixture	 VFKS0009 Reel Table Height Gauge	 VFK0136 Fine Adjustment Screwdriver (3mmφ)	 VFM1080FSP Alignment Tape
 VFK0228 Reel Height Adjustment Plate	 VFK66 Fan-Type Tension Gauge	 VFK0146 Hex Wrench (0.9mm) VFK76 Hex Wrench (1.5mm)	 VFKS0002 Tension Post Adjustment Fixture	 VFK0252 Inter Connection Cable	 VFK0218 Extention Cable (P1) VFK0219 Extention Cable (P2) VFK0220 Extention Cable (P3)	

Panasonic[®]
MATSUSHITA ELECTRIC

Service Manual

RECAM™

Exploded Views & Mechanical Parts List

Portable VTR
AU-100



SPECIFICATIONS

General

Power Source: 12V DC
 Power Consumption: 12W
 Recording System: 4 rotary heads, helical scanning, separate Y/C track system
 Tape Run Mechanism: M-format (1/2" tape)
 Tape Speed: 204.5 mm/s
 Tape: NV-T120 HG tape
 Recording Time: 20 minutes (NV-T120 HG tape)
 FF/REW Time: Less than 5 minutes (NV-T120 HG tape)
 Weight: Approx. 9.02 lbs. (4.1 kg)
 Dimensions: 4-3/4" (W) × 9-3/8" (H) × 10" (D)
 120(W) × 237(H) × 253(D) mm

Video

Television System: NTSC system, 525 lines, 60 fields
 Modulation System: Frequency modulation for luminance signal
 Frequency modulation multiplexing for chrominance signal (I/Q)
 Bandwidth: 3.8 MHz for luminance
 1.0 MHz for chrominance
 Inputs: Y: 1.0 Vp-p (75% color bar), 75Ω unbalanced
 I: 0.714 Vp-p, 75Ω unbalanced
 Q: 0.714 Vp-p, 75Ω unbalanced
 Outputs: NTSC composite video, 1.0 Vp-p, 75Ω

Audio

Frequency response: 50 ~ 15,000 Hz ± 3 dB
 Inputs: MIC: -60 dBm, 600Ω balanced } switch
 LINE: +4 dBm, 600Ω balanced } selectabl
 Output: EARPHONE, -20 dB ~ -32 dB (variable), 8Ω unbalanced
 External Time Code: Input: 2.5 Vp-p, 600Ω unbalanced
 Ambient Temperature: Operating: 32°F ~ 104°F (68°F reference temperature)
 Storage: -4°F ~ 140°F
 Ambient Humidity: 20% ~ 85% (50% reference humidity)

Weight and dimensions shown are approximate.
 Specifications are subject to change without notice.



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MECHANICAL REPLACEMENT PARTS LIST

Notes:

1. * Be sure to make your orders of replacement parts according to this list.
2. IMPORTANT SAFETY NOTICE
Components identified by Δ have special characteristics important for safety.
When replacing any of these components, use only the original ones.

① Load Base Assembly

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
1	VBR0054	A/C Head	1		309	XYN3+F12FXS	Screw	4	
2	VXA1437	A/C Head Base Unit	1		310	XTV3+8F	Tap-Tight Screw	11	
3	VXA1438	Head Base Unit	1		311	XYN3+C5	Screw	1	
4	VMB0973	A/C Height Spring	1		312	XYN2+C4FXS	Screw	1	
5	VMA4289	Nut Bar	1		313	XSS26+6FXS	Flush Screw	1	
6	VXP0421	Capstan Shaft Unit	1		314	XYN26+C10FXS	Screw	2	
7	VXA0869	Ground Angle Unit	1		315	XYN3+C6S	Screw	1	
8-A	VEG0206	Cylinder Unit	1						
8-B	VEB0151	Upper Drum	1						
9	VXA1613	Roller Post (T) Unit	1						
10	VXP0423	Tape Guide	2						
11	VHX0407	Lock Post Collar	2						
12	VXA1522	Inclined Base (T) Unit	1						
13	VXA1555	Shaft Holder (T) Unit	1						
14	VXP0419	Impedance Roller Unit	1						
15	VXL0964	Impedance Roller Arm (1) Unit	1						
16	VMD0100	Post Stopper	1						
17	VMA4941	Flush Nut	2						
18	VMA4436	Shaft Holder Plate	2						
19	VXL0949	Loading Arm (T) Unit	1						
20	VMB0669	Loading Spring	2						
21	VXP0325	Loading Gear Unit	2						
22	VHX0259	Arm Sleeve	2						
23	VJB00839	Sensor Lamp P.C. Board	1						
24	VMA4935	LED Holder Angle	1						
25	VML1032	Erase Head Lever	1						
26	VBS0014	Erase Head	1						
27	VMB0994	Erase Head Spring	1						
28	VXL0950	Loading Arm (S) Unit	1						
29	VXA1614	Roller Post (S) Unit	1						
30	VXA1521	Inclined Base (S) Unit	1						
31	VXA1554	Shaft Holder (S) Unit	1						
32	VMD0277	Brake Release Pin	1						
33	VXA1177	Error Erase Detector Unit	1						
34	VSM0027	Microswitch	1						
35	VMB0404	Adjustment Spring	1						
36	VDF0055	Capstan Pulley	1						
	VDF0056		1						
	VDF0057		1						
37	VMA4944	Loading Base	1						
38	VMB0993	Impedance Arm Spring	1						
39	VJR3	Harness Clamp	1						
101	XVE2FP	Grip	2						
102	XUEV4VW	Grip	2						
103	XUEV4FD	Grip	2						
104	XUC25FP	E-Ring	1						
201	XNG4	M4 Nut	2						
202	XWG4FX	Flush Washer	1						
203	XWV2D4	Polyslider Washer	2						
204	XWGV4D9G	Spring Washer	2						
205	VHN0021	Adjustment Nut	1						
206	XXE3A6	Worm Nut (Pointed)	1						
301	VHD0054	Adjustment Screw (15)	1						
302	XSN3D10FXS	Positive/Negative Screw	1						
303	XSN3+F6S	Screw	2						
304	XTV3+6F	Tap-Tight Screw	3						
305	XYN26+C6	Tap-Tight Screw	2						
306	XYN3F8FXS	Screw	2						
307	XXEV0001	Worm Screw	6						
308	XYN3+C4FXS	Screw	2						

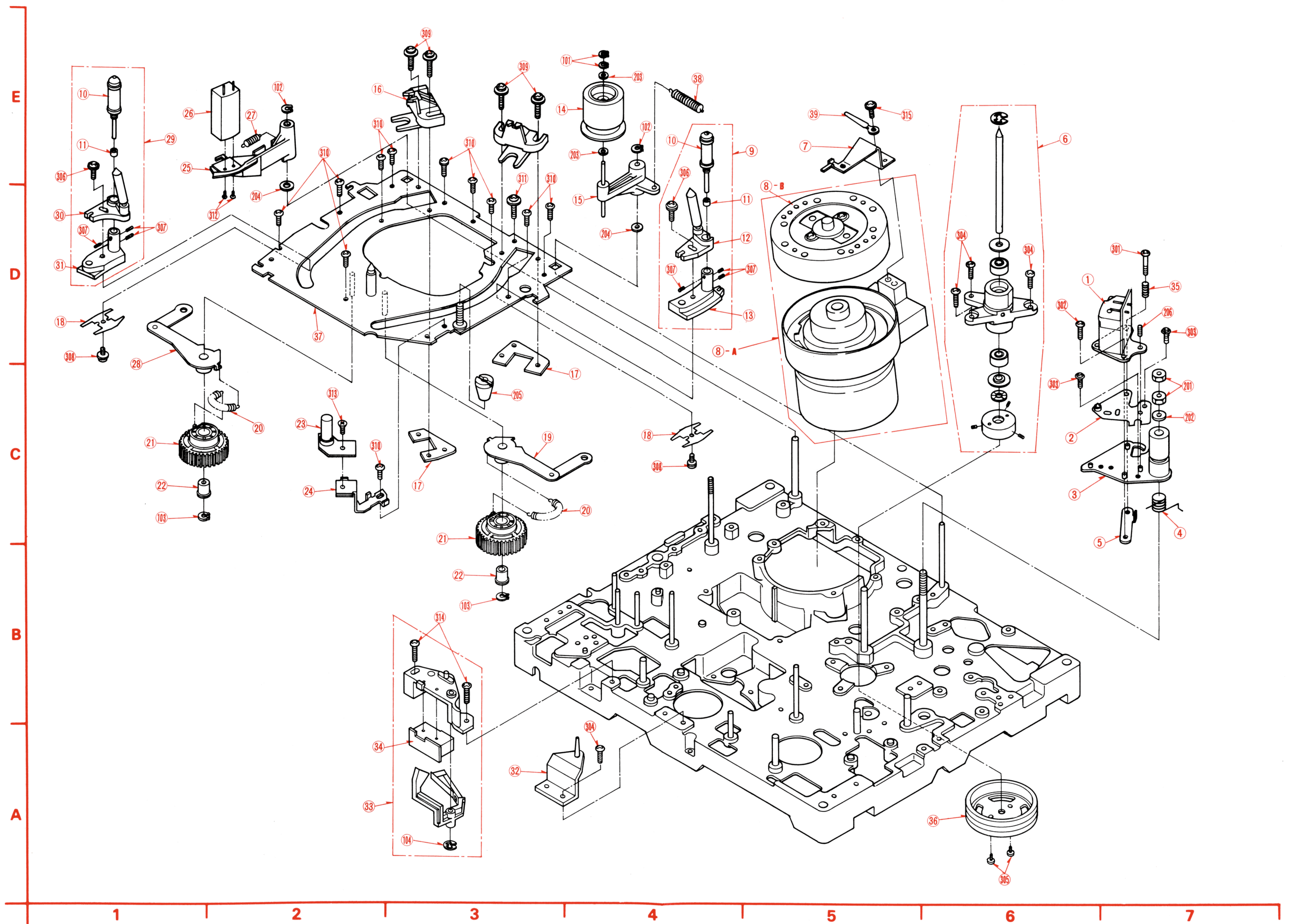


Figure 5-1. Load Base Assembly

Parts List

[illegible]

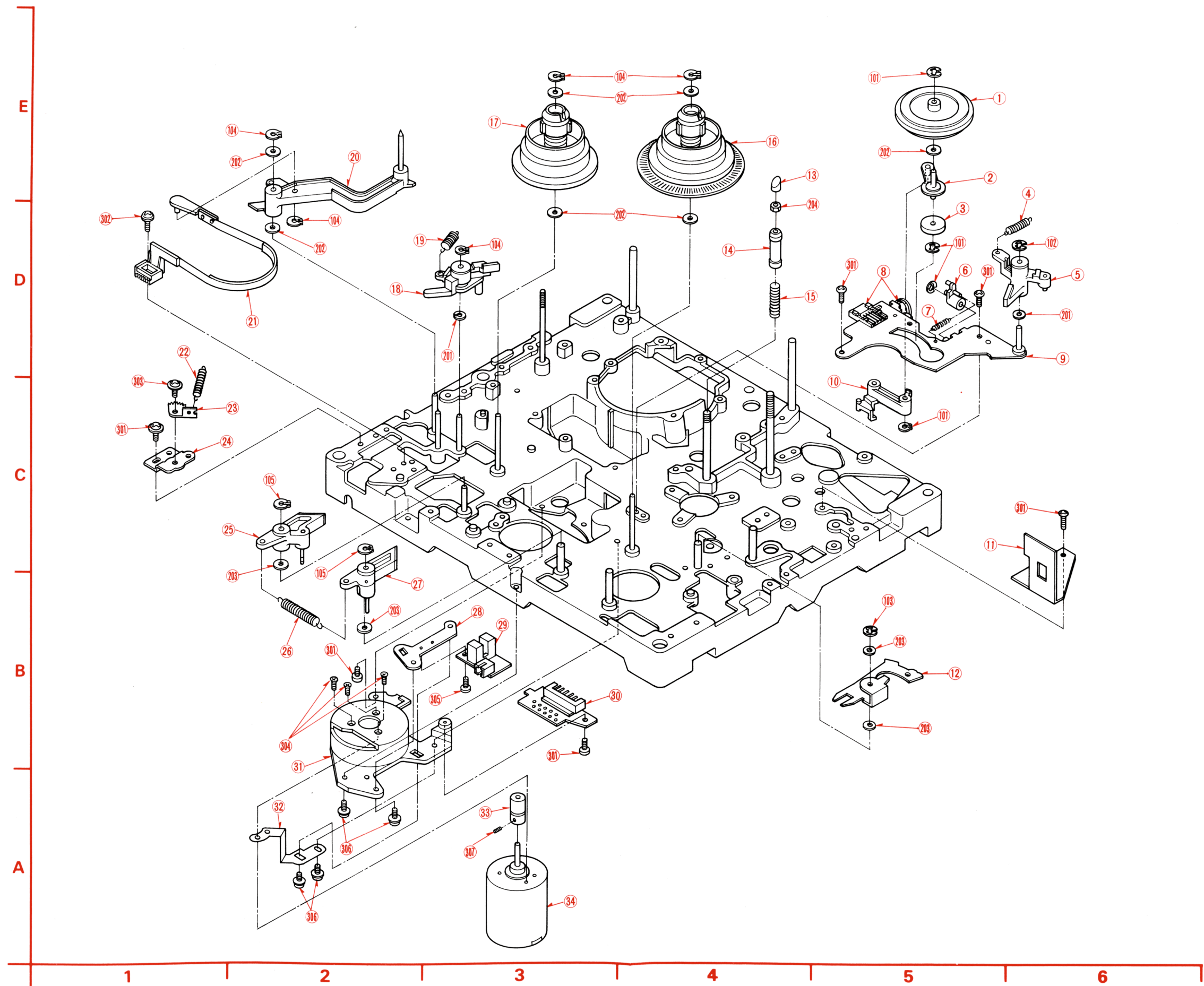


Figure 5-2. Reel/Motor Assembly

3 Load Unit Assembly

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
1	VDF0060	Flywheel	1						
2	VKD0008	Capstan Motor	1						
3	MXN12AD08A	Loading Motor	1						
4	VMA4876	Opener Cover	1						
5	VXA1542	Opener Unit Board	1						
6	VJB00843	Capstan Motor Relay P.C. Board	1						
7	VDP0859	Motor Pulley	1						
8	VXP0418	Interim Pulley Unit	1						
9	VDV0142	Capstan Belt	1						
10	VDP0735	Loading Middle Pulley	1						
11	VXP0427	Pressure Roller Arm Unit	1						
12	VMA4967	Spring Holder	1						
13	VMB0880	Spring for Pin	1						
14	VXL0771	Draw-Out Arm Unit	1						
15	VMB0959	Draw-Arm Spring	1						
16	VMS2119	Draw-Arm Shaft	1						
17	VDP0750	Idler Pulley	1						
18	VJB00520	Take-Up Sensor P.C. Board	1						
19	VMD0091	Transistor Holder (R)	1						
20	VMA4936	CDS Element Metal (R)	1						
21	VJB00521	Supply Sensor P.C. Board	1						
22	VMD0092	Transistor Holder (L)	1						
23	VMA4939	CDS Element Metal (L)	1						
24	VHG0206	Stopper Rubber	1						
25	VMB0735	Holder Spring	1						
26	VMA4932	P Switch Base	1						
27	VSS0063	Mode Select Switch	1						
28	VDG0017	Interim Gear	1						
29	VHX0268	Drive Gear Sleeve	1						
30	VDG0016	Drive Gear	1						
31	VMA4088	Press Board	1						
32	VDV0135	Loading Belt (2)	1						
33	VDP0748	Large Pulley	1						
34	VHX0408	Pressure Roller Arm Collar	1						
35	VDV0122	Loading Belt (1)	1						
101	XUEV3VW	Grip	5						
102	XUEV4VW	Grip	1						
201	XMGV3D6G	Spring Washer	9						
202	XWC3BF	Washer	3						
203	VHD0045	Nylon Nut	1						
204	XMGV4D9G	Spring Washer	2						
205	XWA3B	Spring Washer	2						
206	XNG3B	M3 Nut	1						
207	XNG3C	M3 Nut	1						
301	XXE26D3FP	Worm Screw	2						
302	XTV3+8F	Tap-Tight Screw	8						
303	XYN3+C4FXS	Screw	2						
304	XYN2+C4	Pan-Head Screw	3						
305	XYN3+C6	Screw	1						
306	XTV+10F	Tap-Tight Screw	2						
307	XTV3+6FFXS	Tap-Tight Screw	1						
308	XSN3+10FXS	Pan-Head Screw	1						
309	XYN3+F8	Screw	1						

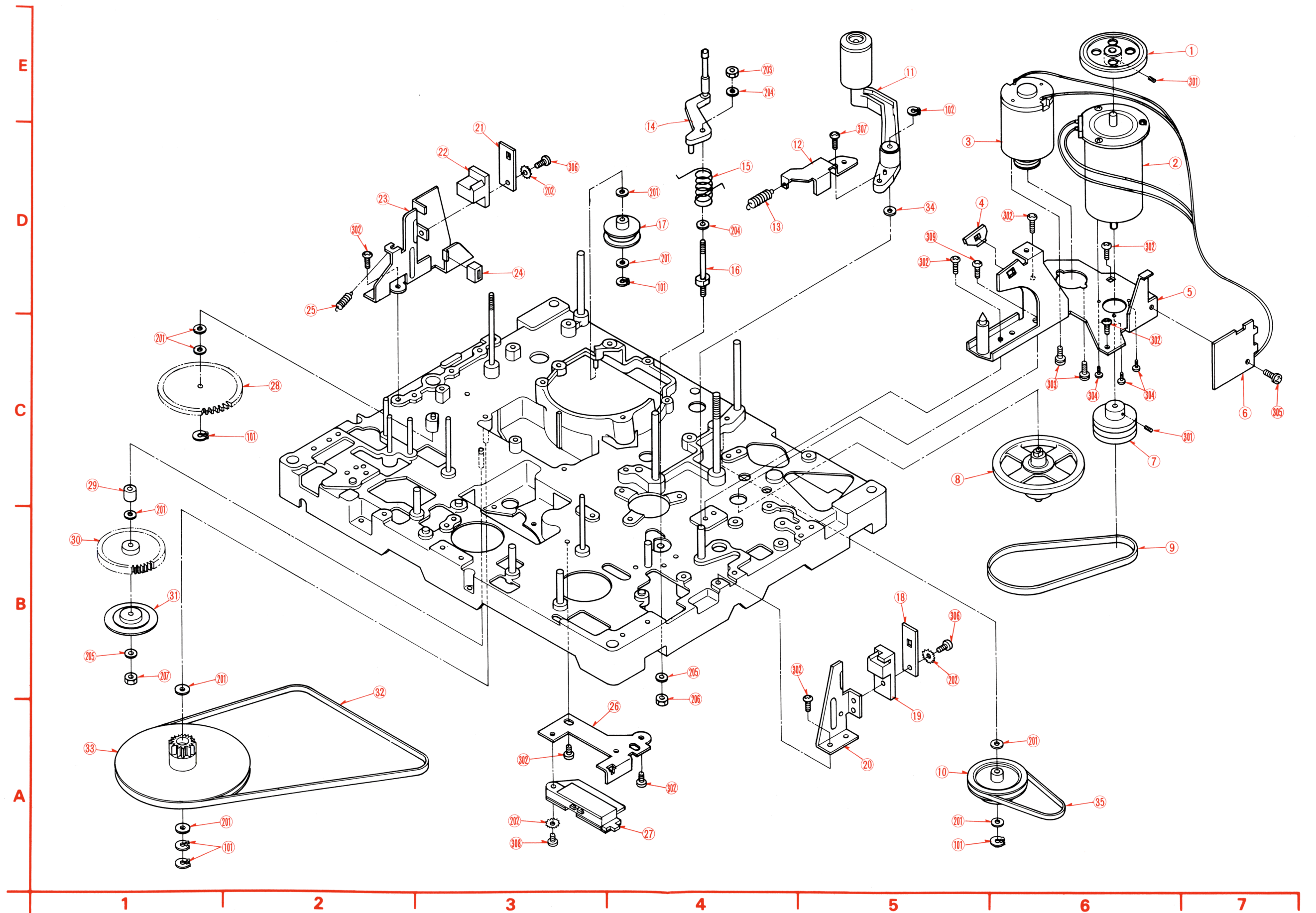


Figure 5-3. Load Unit Assembly

Parts List

REV 0

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
1	VMK0220	Coupling Plate	1	
2	VMD0380	Gasket	1	
3	VEK1550	Head Connection Unit	1	
4	VSC0649	Shield Case	1	
5	VJS1268	Mic In Connector	1	
6	VMA4993	Coupling Reinf. Plate (S) Unit	1	
7	VES0191	Bour Meter P.C. Board Unit	1	
8	VMA4939	Photo Base A	1	
9	VJB00841	Reel Encoder P.C. Board	1	
10	VMA4940	Photo Base B	1	
11	VJB00842	Reel Encoder P.C. Board	1	
12	VMA4994	Coupling Reinf. Plate (L) Unit	1	
13	VMA4946	Chassis Angle (L)	1	
14	VMA4947	Chassis Angle (R)	1	
15	VSJ0059	Solenoid	1	
16	VDG0113	Oil Damper Gear	1	
17	VXA1545	Special Belt (L) Unit	1	
18	VXA1544	Special Belt (R) Unit	1	
19	VXA1635	P3 Base	1	
20	VXA1603	P3 Base Reinforcement Plate	1	
21	VMA5866	TG Base (L)	1	
22	VXA1552	P3 Base (L) Unit	1	
23	VJB0476	Audio P.C. Board	1	
24	VMA5864	TCG Base	1	
25	VMA4990	Rear Reinforcement Metal	1	
26	VXA1620	Special Belt (C)	1	
27	VMA5867	LED with Holder	1	
28	VJB00832	Warning LED P.C. Board	1	
29	VMA5865	TCG Base (L)	1	
30	VEJ0230	Connection Board Unit	1	
31	EVSNBAS15A14	Monitor Level	1	
32	VST0060	MTE206N	1	
33	VJJ0086	Earphone Jack	1	
34	VJS1268	Remo	1	
35	VJS1275	BNC	1	
36	VXA1537	Cassette-Up Unit	1	
37	VJS1267	Connector	1	
38	VMS2117	Cassette Hold Pin	1	
39	VJF0108	Plastic Pin	4	
40	VMB0730	Cassette Holder Spring	2	
41	VMB0734	Distinction Lever Spring	1	
42	VXK0515	Chassis Unit	1	
43	VMA5782	Cassette Guide	1	
44	VGT0296	Headphone Monitor VR Knob	1	
45	VST0059	Switch	1	
46	VJS1269	Canon Connector	1	
101	XUC7FP	E-Ring	1	
102	XUC3FP	E-Ring	8	
201	VMX0427	Nylon Washer (L)	1	
202	VHN0024	Special Nut	1	
203				
204	XWV6A9	Polyslider	3	
205	VHX0448	Washer	4	
206	XNG2	ME Nut	2	
207	XWGV9D15	Polyslider Washer	1	
208	XWG4FX	Washer	2	
301	XYN3+P6	Screw	8	

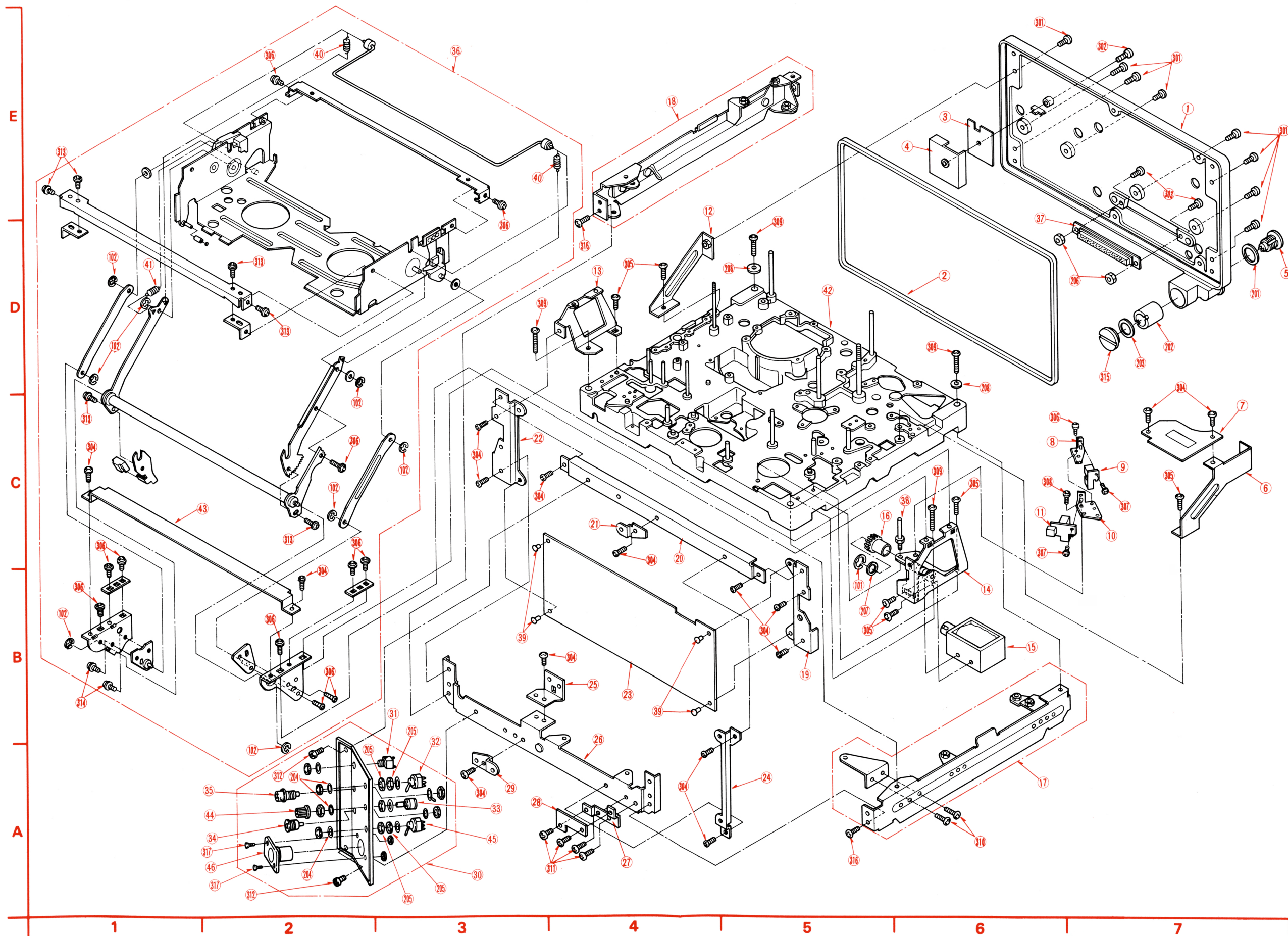


Figure 5-5. Chassis Unit Assembly

6 Case Assembly

Parts List

[illegible]

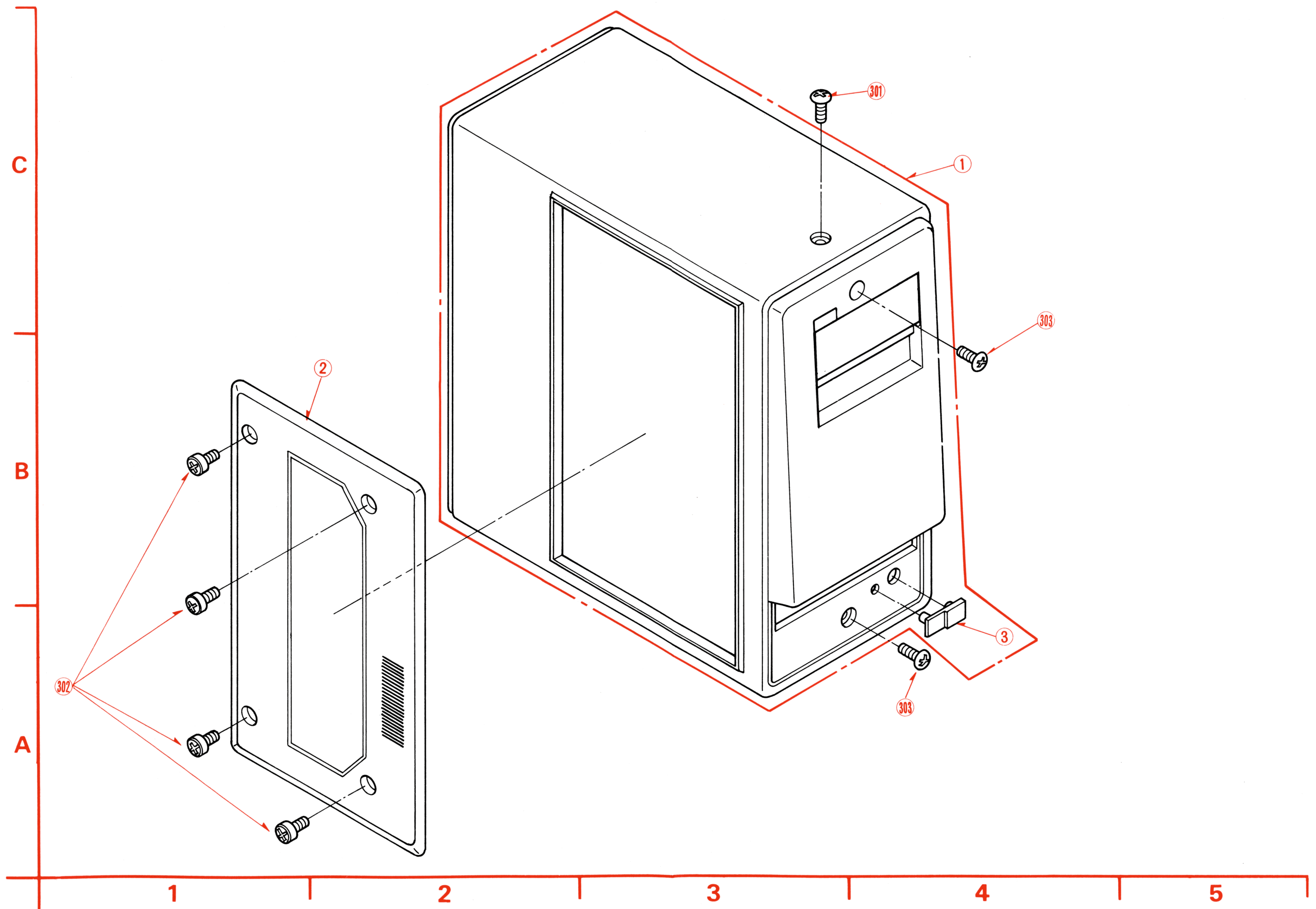


Figure 5-6. Case Assembly

7

Parts List

[illegible]

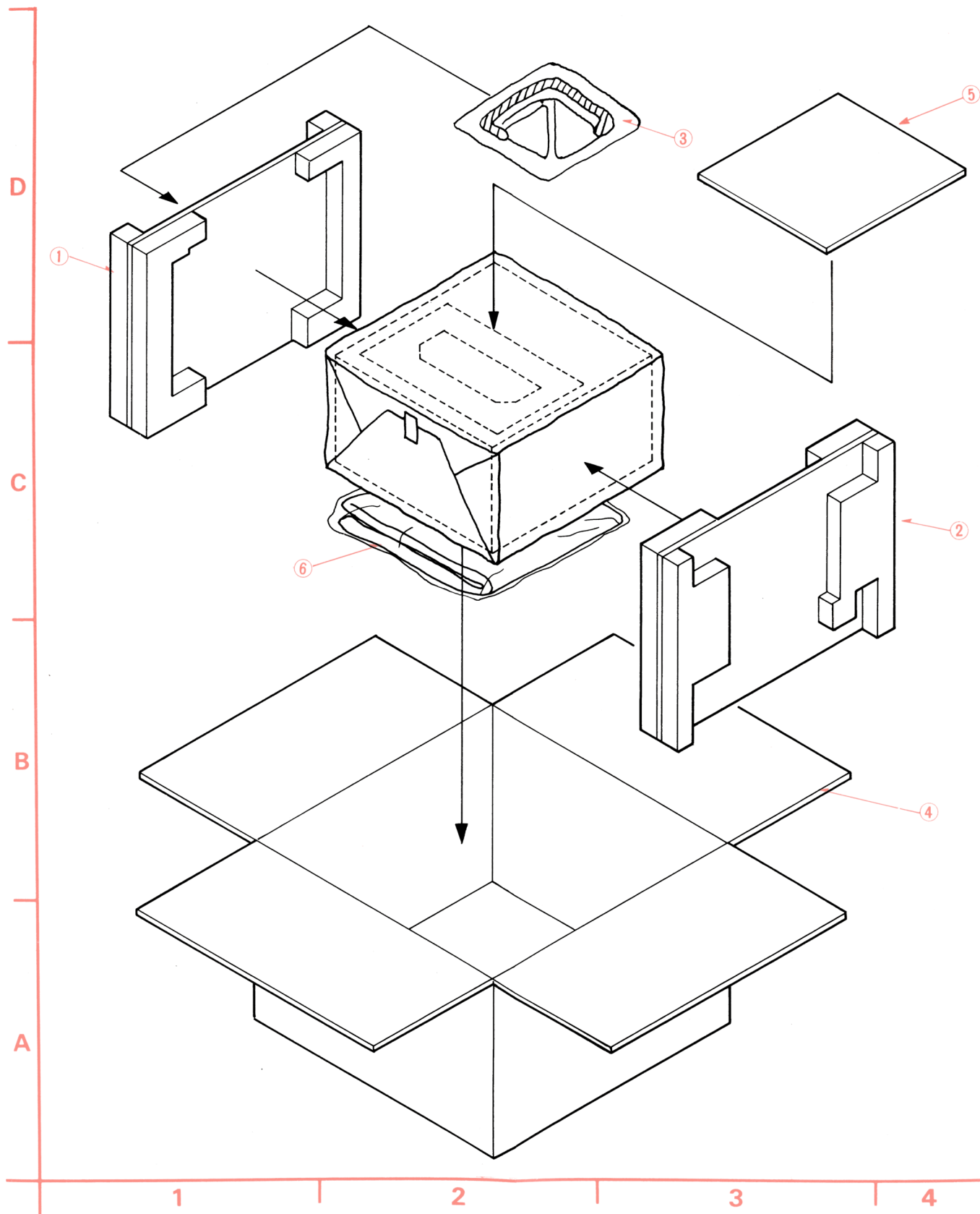


Figure 5-7. Packing Parts Assembly

INTERCONNECTION SECTION

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP03130A	HEAD CONNECTION P.C. BOARD	1		P300	VJS1295	Connector	1	
	VEP00833A	HOOR METER P.C. BOARD	1						
	VEP0476A	AUDIO PROCESSOR P.C. BOARD	1				Supply Hall IC Board		
	VEP02138A	SYSTEM SERVO CONTROL P.C. BOARD	1			DN838	Hall IC	1	
	VEP03129A	VIDEO PROCESSOR P.C. BOARD	1			VJB00594	P.C.B.	1	
	VEP00844A (VEP0844A)	TIME CODE GENERATOR	1						
							Solenoid Photo Sensor Board		
						ON1128	Phototransistor	1	
					R602	ERD10TJ102	Resistor	1K	1
					P609	VJP1242T	Connector	2P	1
						VJB00837	P.C.B.	1	
							Position SW Board		
		Warning LED Board			SW605	VSS0048	Mode Select SW	1	
D603,604	LN23SRP	LED	2			VJB00868	P.C.B.	1	
D606,607	LN23SRP	LED	2						
	VJB00832	P.C.B.	1						
		Coupling Plate Board							
P00	VJS1264	Connector	64P	1			Reel Motor I/O Board		
		System/Servo Control Board			P601	VJP1250T	Connector	10P	1
						VJB00838	P.C.B.	1	
P200	VJS1264	Connector	64P	1					
							Photo Sensor LED Board		
		Audio Processor Board			D601,602	LN58	Sensor LED	2	
P100	VJS1218	Connector	1			VJB00839	P.C.B.	1	

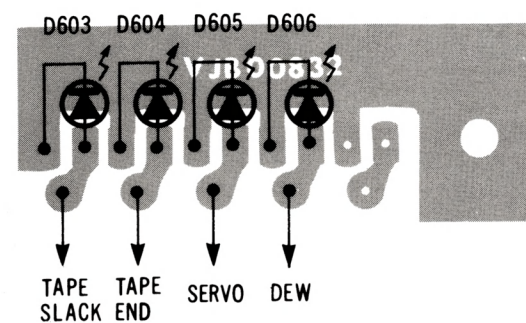
Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Supply Photo Sensor Board							
C601	ECKW1H222KB	Ceramic 50V 2200P	1						
Q602	PN150NV	Phototransistor	1						
	VJB00521	P.C.B.	1						
		Take-Up Photo Sensor Board					Safety SW Board		
C602	ECKW1H222KB	Ceramic 50V 2200P	1		SW603	VSM0027	Switch	1	
Q603	PN150NV	Phototransistor	1			VJB00525			
	VJB00520	P.C.B.	1						
		A/C Head Board							
R604,605	ERD25TJ100A	Resistors 10	2						
	VJB00840	P.C.B.	1						
		Reel Encoder I Board							
	ON1110	Phototransistor	1						
	VJB00841	P.C.B.	1						
		Reel Encoder II Board							
	ON1110	Phototransistor	1						
R606,607	ERD10TJ221	Resistors 220	2						
P608	VJP1243T	Connector 3P	1						
	VJB00842	P.C.B.	1						
		Capstan Motor I/O Board							
P605	VJP1246T	Connector 6P	1						
	VJB00843	P.C.B.	1						

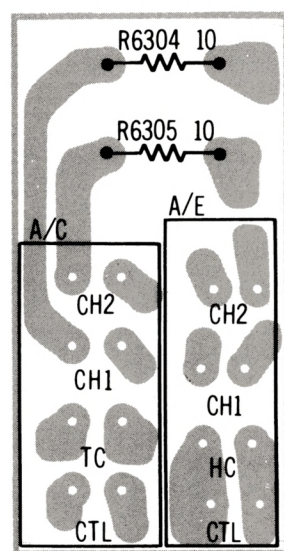
Parts List

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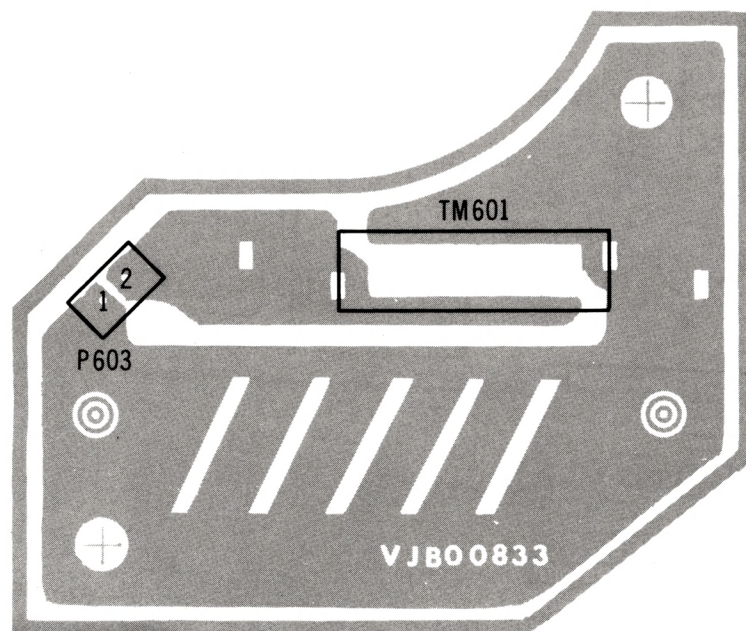
**WARNING LED BOARD C.B.
(VJB00832)**



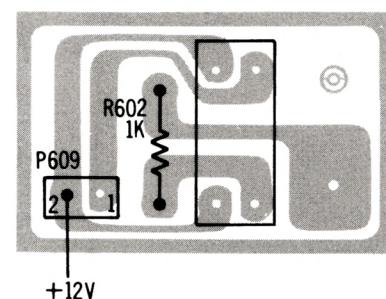
**A/C HEAD BOARD C.B.
(VJB00840)**



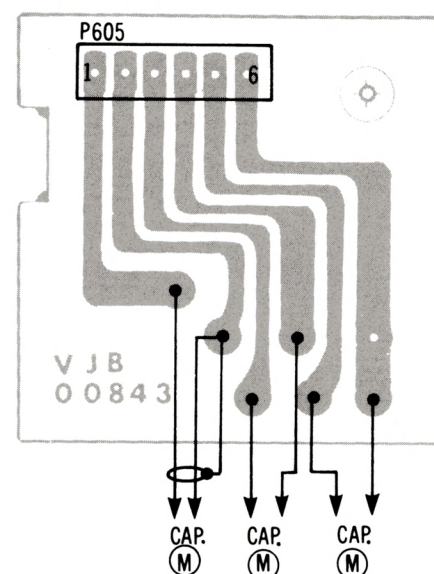
HOUR METER C.B. (VJB00833)



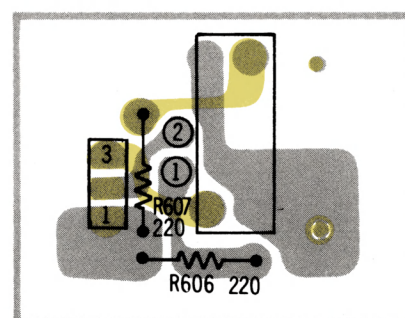
**SOLENOID PHOTO SENSOR
BOARD C.B. (VJB00837)**



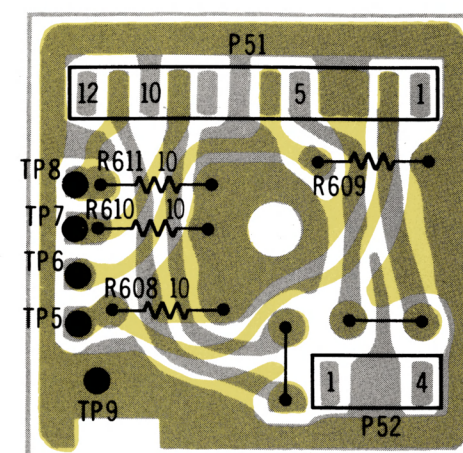
**CAPSTAN MOTOR I/O BOARD
C.B. (VJB00843)**



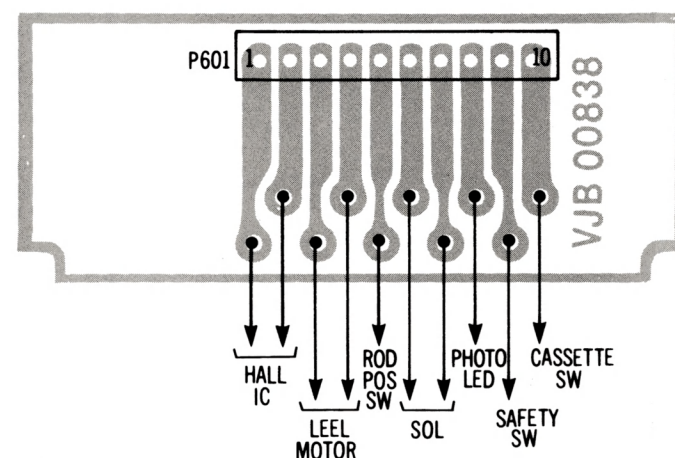
**REEL ENCODER (2) BOARD
C.B. (VJB00842)**



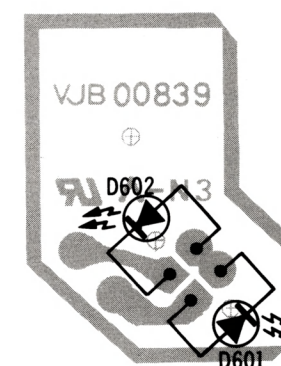
**HEAD CONNECTION C.B.
(VJB03130)**



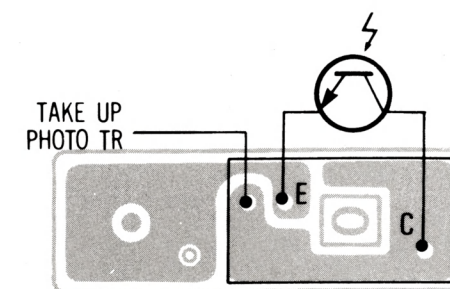
**REEL MOTOR I/O BOARD C.B.
(VJB00838)**



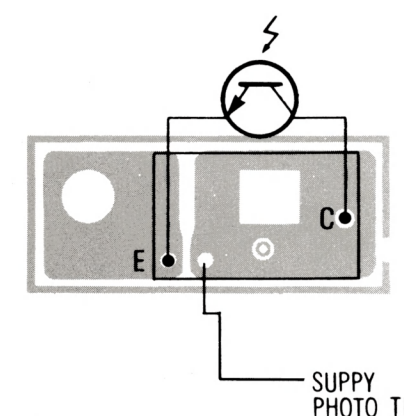
**PHOTO SENSOR LED
BOARD C.B. (VJB00839)**



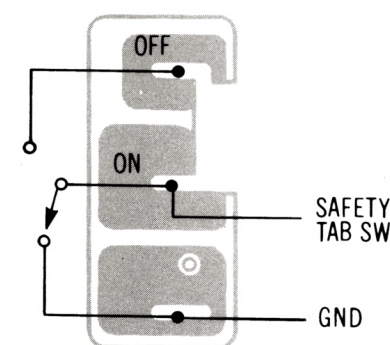
**TAKEUP PHOTO SENSOR
BOARD C.B. (VJB00520)**



**SUPPLY PHOTO SENSOR
BOARD C.B. (VJB00521)**



**SAFETY SW BOARD
C.B. (VJB00525)**



INTERCONNECTION SCHEMATIC DIAGRAM

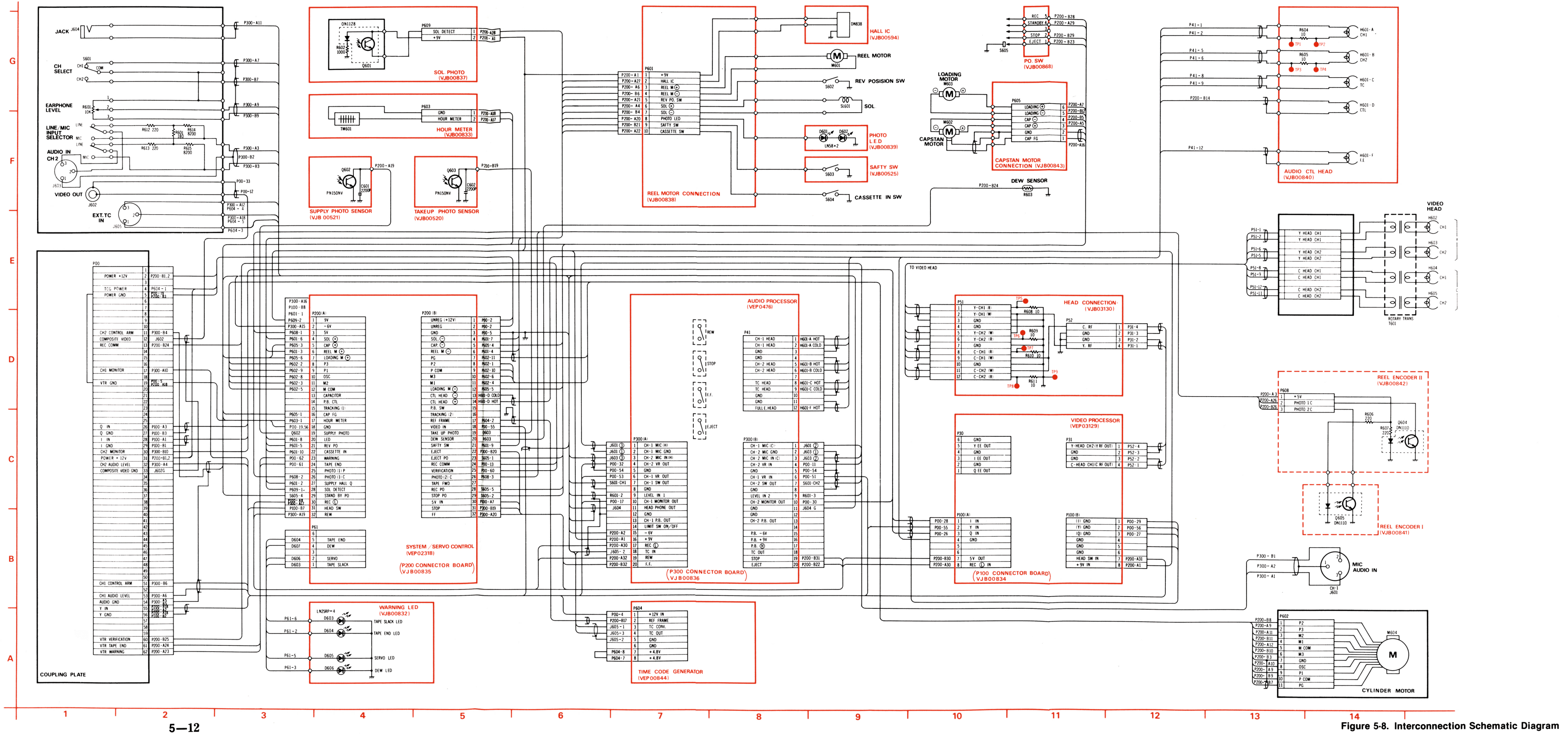


Figure 5-8. Interconnection Schematic Diagram

Panasonic[®]
MATSUSHITA ELECTRIC

Service Manual

RECAM™

Exploded Views & Mechanical Parts List

Portable VTR

AU-100A



M-VISION™

SPECIFICATIONS

General

Power Source: 12V DC
 Power Consumption: 12W
 Recording System: 4 rotary heads, helical scanning, separate Y/C track system
 Tape Run Mechanism: M-format (1/2" tape)
 Tape Speed: 204.5 mm/s
 Tape: NV-T120 HG tape
 Recording/Playback
 Time: 20 minutes (NV-T120 HG tape)
 FF/REW Time: Less than 5 minutes (NV-T120 HG tape)
 Weight: Approx. 9.02 lbs. (4.1 kg)
 Dimensions: 4-3/4"(W) × 9-3/8"(H) × 10"(D)
 120(W) × 237(H) × 253(D) mm

Video

Television System: NTSC system, 525 lines, 60 fields
 Modulation System: Frequency modulation for luminance signal
 Frequency modulation multiplexing for chrominance signal (I/Q)
 Bandwidth: 3.8 MHz for luminance
 1.0 MHz for chrominance
 Inputs: Y: 1.0 Vp-p (75% color bar), 75Ω unbalanced
 I: 0.714 Vp-p, 75Ω unbalanced
 Q: 0.714 Vp-p, 75Ω unbalanced
 Outputs: NTSC composite video, 1.0 Vp-p, 75Ω

Audio

Frequency response: 50 ~ 15,000 Hz ± 3 dB
 Inputs: MIC: -60 dBm, 600Ω balanced } switch
 LINE: +4 dBm, 600Ω balanced } selectabl
 Output: EARPHONE, -20 dB ~ -32 dB (variable), 8Ω unbalanced

External Time Code:

Input: 2.5 Vp-p, 600Ω unbalanced
 Ambient Temperature: Operating: 32°F ~ 104°F (68°F reference temperature)
 Storage: -4°F ~ 140°F
 Ambient Humidity: 20% ~ 85% (50% reference humidity)

Weight and dimensions shown are approximate.
 Specifications are subject to change without notice.



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1 Load Base Assembly

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
1	VBR0054	A/C Head	1		309	XYN3+F12FXS	Screw	4	
2	VXA1437	A/C Head Base Unit	1		310	XTV3+8F	Tap-Tight Screw	11	
3	VXA1438	Head Base Unit	1		311	XYN3+C5	Screw	1	
4	VMB0973	A/C Height Spring	1		312	XYN2+C4FXS	Screw	1	
5	VMA4289	Nut Bar	1		313	XSS26+6FXS	Flush Screw	1	
6	VXP0421	Capstan Shaft Unit	1		314	XYN26+C10FXS	Screw	2	
7	VXA0869	Ground Angle Unit	1		315	XYN3+C6S	Screw	1	
8-A	VEG0206	Cylinder Unit	1						
8-B	VEH0151	Upper Drum	1						
10	VXP0423	Tape Guide	2						
11	VHX0407	Lock Post Collar	2						
12	VXA1522	Inclined Base (T) Unit	1						
13	VXA1555	Shaft Holder (T) Unit	1						
14	VXP0419	Impedance Roller Unit	1						
15	VXL0964	Impedance Roller Arm (1) Unit	1						
16	VMD0100	Post Stopper	1						
17	VMA4941	Flush Nut	2						
18	VMA4436	Shaft Holder Plate	2						
19	VXL0949	Loading Arm (T) Unit	1						
20	VMB0669	Loading Spring	2						
21	VXP0325	Loading Gear Unit	2						
22	VHX0259	Arm Sleeve	2						
23	VJB00839	Sensor Lamp P.C. Board	1						
24	VMA4935	LED Holder Angle	1						
25	VHL1442	Erase Head Lever	1						
26	VBS0014	Erase Head	1						
27	VMB0994	Erase Head Spring	1						
28	VXL0950	Loading Arm (S) Unit	1						
30	VXA1521	Inclined Base (S) Unit	1						
31	VXA1554	Shaft Holder (S) Unit	1						
32	VMD0277	Brake Release Pin	1						
33	VXA1177	Error Erase Detector Unit	1						
34	VSM0027	Microswitch	1						
35	VMB0404	Adjustment Spring	1						
36	VDF0055	Capstan Pulley	1						
	VDF0056		1						
	VDF0057		1						
37	VXA1536	Loading Base	1						
38	VMB0993	Impedance Arm Spring	1						
39	VJR3	Harness Clamp	1						
40	VXA1951	Playback P.C.B.							
		Holder Unit	1						
101	XUEV2FP	Grip	2						
102	XUEV4VW	Grip	2						
103	XUEV4FD	Grip	2						
104	XUC25FP	E-Ring	1						
201	XNG4	M4 Nut	2						
202	XWG4FX	Flush Washer	1						
203	XWV2D4	Polyslider Washer	2						
204	XWG4D9G	Spring Washer	2						
205	VHN0021	Adjustment Nut	1						
206	XXE3A6	Worm Nut (Pointed)	1						
301	VHD0054	Adjustment Screw (15)	1						
302	XSN3D10FXS	Positive/Negative Screw	1						
303	XSN3+F6S	Screw	2						
304	XTV3+6F	Tap-Tight Screw	3						
305	XYN26+C6	Tap-Tight Screw	2						
306	XYN3F8FXS	Screw	2						
307	XXEV0001	Worm Screw	6						
308	XYN3+C4FXS	Screw	2						

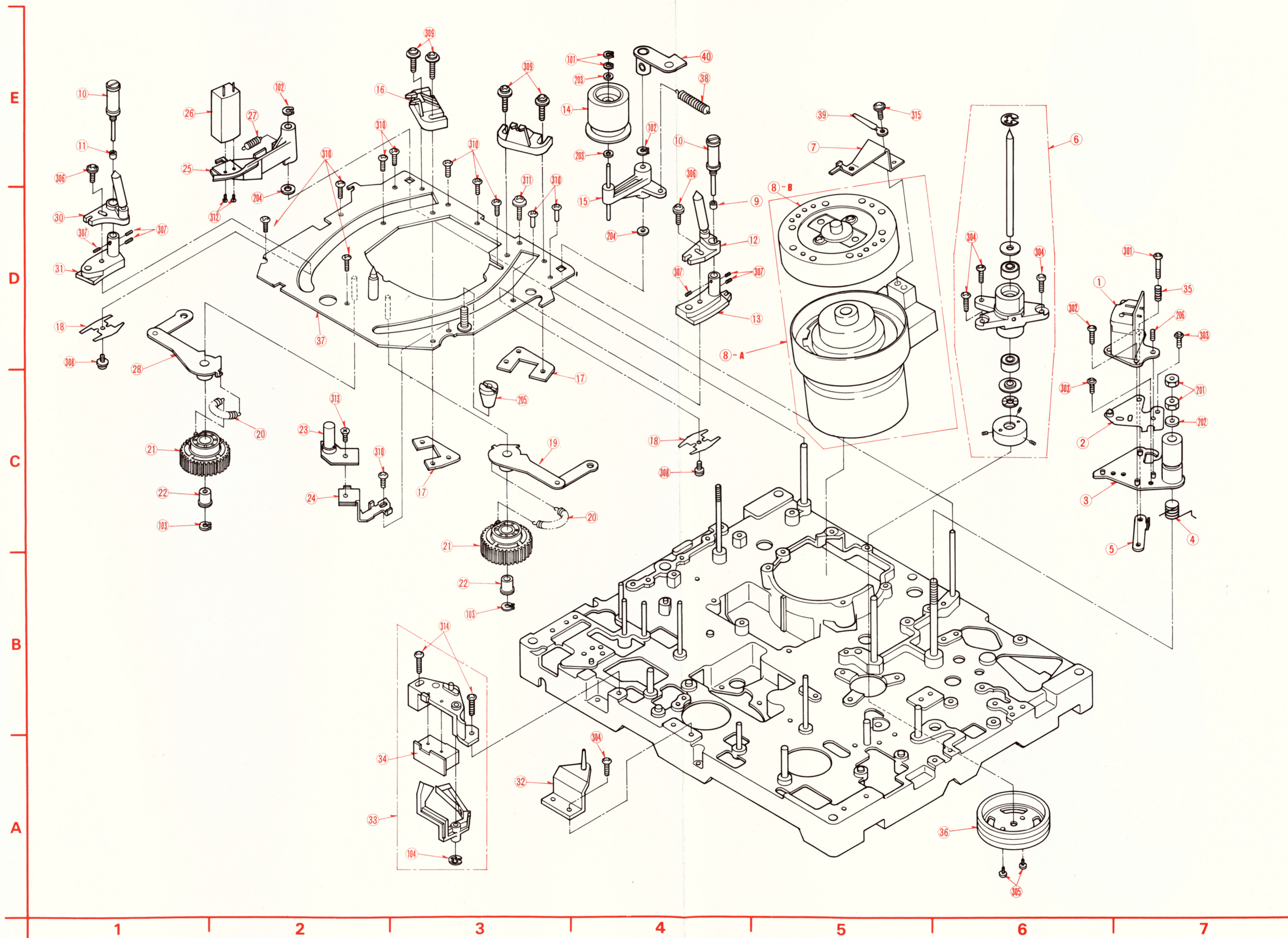


Figure 5-1. Load Base Assembly

INTERCONNECTION SECTION

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP03130A	HEAD CONNECTION P.C. BOARD	1		P300	VJS1295	Connector	1	
	VEP00833A	HOUR METER P.C. BOARD	1						
	VEP0476A	AUDIO PROCESSOR P.C. BOARD	1				Supply Hall IC Board		
	VEP02138A	SYSTEM SERVO CONTROL P.C. BOARD	1			DN838A	Hall IC	1	
	VEP03129A	VIDEO PROCESSOR P.C. BOARD	1			VJB00594	P.C.B.	1	
	VEP00844A (VEP0844A)	TIME CODE GENERATOR	1						
							Solenoid Photo Sensor Board		
						ON1128	Phototransistor	1	
					R602	ERD10TJ102	Resistor	1K 1	
					P609	VJP1242T	Connector	2P 1	
						VJB00837	P.C.B.	1	
							Position SW Board		
		Warning LED Board			SW605	VSS0043	Mode Select SW	1	
D603,604	LN23SRP	LED	2						
D606,607	LN23SRP	LED	2						
	VJB00832	P.C.B.	1						
		Coupling Plate Board							
P00	VJS1264	Connector	64P 1				Reel Motor I/O Board		
		System/Servo Control Board			P601	VJP1250T	Connector	10P 1	
						VJB00838	P.C.B.	1	
P200	VJS1264	Connector	64P 1						
							Photo Sensor LED Board		
		Audio Processor Board			D601,602	LN58	Sensor LED	2	
P100	VJS1218	Connector	1			VJB00839	P.C.B.	1	

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
		Supply Photo Sensor Board							
C601	ECKW1H222KB	Ceramic 50V 2200P	1						
Q602	PN150NV	Phototransistor	1						
	VJB00521	P.C.B.	1						
		Take-Up Photo Sensor Board					Safety SW Board		
C602	ECKF1H222KB	Ceramic 50V 2200P	1		SW603	VSM0027	Switch	1	
Q603	PN150NV	Phototransistor	1			VJB00525			
	VJB00520	P.C.B.	1						
		A/C Head Board							
R604,605	ERD25TJ100A	Resistors 10	2						
		Reel Encoder I Board							
	ON1110	Phototransistor	1						
			1						
		Reel Encoder II Board							
	ON1110	Phototransistor	1						
R606,607	ERD10TJ221	Resistors 220	2						
P608	VJP1243T	Connector 3P	1						
	VJB00842	P.C.B.	1						
		Capstan Motor I/O Board							
P605	VJP1246T	Connector 6P	1						
	VJB00843	P.C.B.	1						

REV 1

INTERCONNECTION SCHEMATIC DIAGRAM

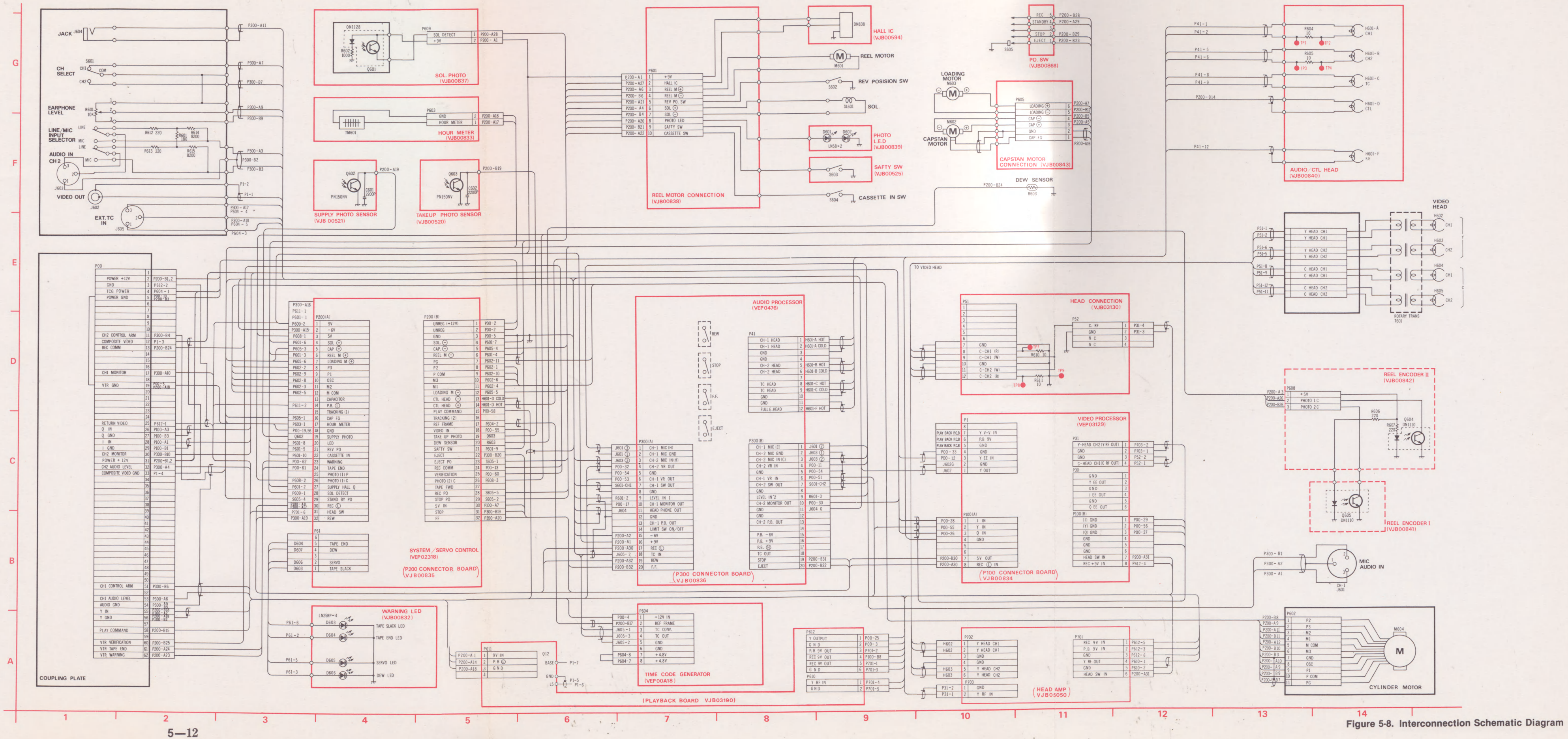


Figure 5-8. Interconnection Schematic Diagram

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Portable VTR

AU-100A

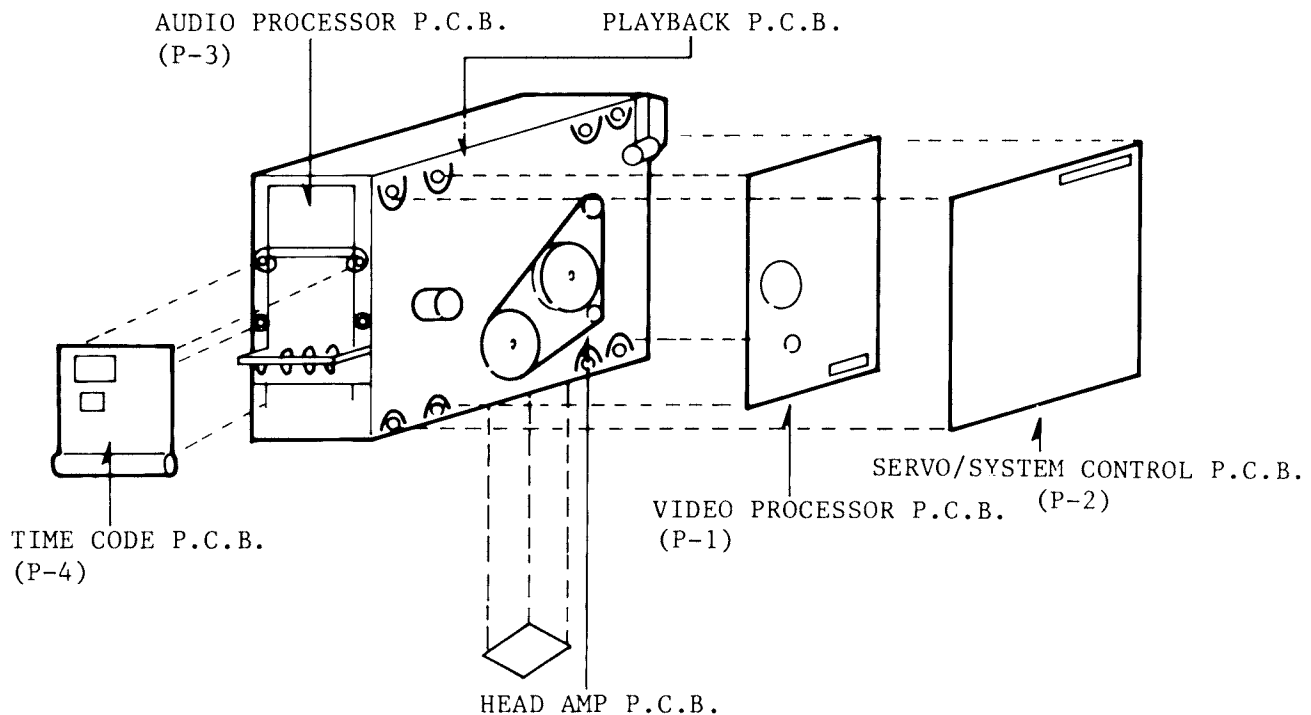


M-VISIONTM

Video Processor Circuit (P1)

- *Electrical Parts List*
- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

Video Processor C.B.A. (VEP03129A)



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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP03129A	VIDEO P.C. BOARD			R23	ERJ8GCJ271	270	1	
					R24,25	ERJ8GCJ333	33K	2	
					R26,27	ERJ8GCJ102	1K	2	
		Integrated Circuits			R28	ERJ8GCJ332	3.3K	1	
IC1	AN6310		1		R29	ERJ8GCJ222	2.2K	1	
IC2	AN6300		1		R30	ERJ8GCJ821	820	1	
IC3	AN6310		1		R31,32	ERJ8GCJ153	15K	2	
IC4	AN612		1		R33	ERJ8GCJ222	2.2K	1	
IC5	MN4528B		1		R34	ERJ8GCJ682	6.8K	1	
					R35	ERJ8GCJ561	560	1	
					R36	ERJ8GCJ332	3.3K	1	
					R37	ERJ8GCJ682	6.8K	1	
		Transistors			R38	ERJ8GCJ152	1.5K	1	
Q1-6	2SD601		6		R39	ERJ8GCJ561	560	1	
Q7	2SB709		1		R40,41	ERJ8GCJ333	33K	2	
Q8-11	2SD601		4		R42	ERJ8GCJ332	3.3K	1	
Q12,13	2SC2295		2		R43,44	ERJ8GCJ392	3.9K	2	
Q14	2SA1022		1		R45,46	ERJ8GCJ560	56	2	
Q15	2SC2295		1		R47	ERJ8GCJ750	75	1	
Q16,17	2SD601		2		R48	ERJ8GCJ183	18K	1	
Q18	2SC2188		1		R49	ERJ8GCJ103	10K	1	
Q19	2SB710		1		R50	ERJ8GCJ102	1K	1	
Q20,21	2SD602		2		R51	ERJ8GCJ471	470	1	
Q22	2SB710		1		R52	ERJ8GCJ102	1K	1	
Q23-25	2SD601		3		R54	ERJ8GCJ102	1K	1	
Q26	2SC2295		1		R55	ERJ8GCJ821	820	1	
Q27,28	2SD601		2		R56	ERJ8GCJ153	15K	1	
Q29	2SC2188		1		R57	ERJ8GCJ103	10K	1	
Q30	2SB710		1		R58	ERJ8GCJ183	18K	1	
Q31,32	2SD602		2		R59	ERJ8GCJ223	22K	1	
Q33	2SB710		1		R60	ERJ8GCJ331	330	1	
Q34	2SB709		1		R61	ERJ8GCJ102	1K	1	
Q35-42	2SD601		8		R62	ERJ8GCJ392	3.9K	1	
Q49,50	2SD601		2		R63	ERJ8GCJ102	1K	1	
Q51	2SC2295		1		R64	ERJ8GCJ392	3.9K	1	
					R65	ERJ8GCJ102	1K	1	
		Diodes			R66,67	ERJ8GCJ470	47	2	
D1-3	1SS16		3		R68,69	ERJ8GCJ4R7	4.7	2	
D4	MA26		1		R70	ERJ8GCJ561	560	1	
D5-7	MA151A		3		R71	ERJ8GCJ680	68	1	
D8,9	1SS16		2		R72	ERJ8GCJ473	47K	1	
D10,11	MA151A		2		R73	ERJ8GCJ223	22K	1	
D12	1SS16		1		R74	ERJ8GCJ333	33K	1	
D15	MA1056		1		R75	ERJ8GCJ332	3.3K	1	
D17,18	MA151K		2		R76	ERJ8GCJ181	180	1	
					R77	ERJ8GCJ394	390K	1	
		Resistors			R78	ERJ8GCJ473	47K	1	
R1,2	ERJ8GCJ223	22K	2		R79,80	ERJ8GCJ152	1.5K	2	
R3	ERJ8GCJ102	1K	1		R81	ERJ8GCJ473	47K	1	
R4	ERJ8GCJ391	390	1		R82	ERJ8GCJ152	1.5K	1	
R5	ERJ8GCJ471	470	1		R83,84	ERJ8GCJ102	1K	2	
R6	ERJ8GCJ273	27K	1		R85	ERJ8GCJ152	1.5K	1	
R7	ERJ8GCJ392	3.9K	1		R86	ERJ8GCJ222	2.2K	1	
R8	ERJ8GCJ153	15K	1		R87	ERJ8GCJ470	47	1	
R9	ERJ8GCJ181	180	1		R88	ERJ8GCJ270	27	1	
R10	ERJ8GCJ562	5.6K	1		R89,90	ERJ8GCJ223	22K	2	
R11	ERJ8GCJ102	1K	1		R91	ERJ8GCJ182	1.8K	1	
R12	ERJ8GCJ182	1.8K	1		R92	ERJ8GCJ331	330	1	
R13	ERJ8GCJ561	560	1		R93	ERJ8GCJ332	3.3K	1	
R14	ERJ8GCJ182	1.8K	1		R94	ERJ8GCJ272	2.7K	1	
R15	ERJ8GCJ122	1.2K	1		R95	ERJ8GCJ102	1K	1	
R16	ERJ8GCJ471	470	1		R96	ERJ8GCJ471	470	1	
R17	ERJ8GCJ102	1K	1		R97,98	ERJ8GCJ223	22K	2	
R18	ERJ8GCJ152	1.5K	1		R99	ERJ8GCJ102	1K	1	
R19	ERJ8GCJ102	1K	1		R100	ERJ8GCJ222	2.2K	1	
R20	ERJ8GCJ223	22K	1		R101	ERJ8GCJ103	10K	1	
R21	ERJ8GCJ681	680	1		R102	ERJ8GCJ124	120K	1	
R22	ERJ8GCJ391	390	1		R103	ERJ8GCJ332	3.3K	1	
					R104	ERJ8GCJ821	820	1	
					R105	ERJ8GCJ122	1.2K	1	

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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R106,107	ERJ8GCJ123	12K	2		R230	ERJ8GCJ472	4.7K	1	
R108	ERJ8GCJ102	1K	1		R231	ERJ8GCJ331	330	1	
R109	ERJ8GCJ750	75	1		R233	ERJ8GCJ560	56	1	
R110	ERJ8GCJ183	18K	1		R234	ERJ8GCJ101	100	1	
R111	ERJ8GCJ682	6.8K	1		R235	ERD10TJ750	75	1	
R112	ERJ8GCJ102	1K	1		R236	ERJ8GCJ274	270K	1	
R113	ERJ8GCJ471	470	1		R237	ERJ8GCJ103	10K	1	
R114,115	ERJ8GCJ102	1K	2						
R117	ERJ8GCJ153	15K	1						
R118	ERJ8GCJ103	10K	1				Variable Resistors		
R119	ERJ8GCJ821	820	1		VR1	EVM38GA00B32	300	1	
R120	ERJ8GCJ183	18K	1		VR2	EVM38GA00B13	1K	1	
R121	ERJ8GCJ223	22K	1		VR3	EVM38GA00B54	50K	1	
R122	ERJ8GCJ331	330	1		VR4,54	EVM38GA00B53	5K	2	
R123	ERJ8GCJ102	1K	1		VR6	EVM38GA00B13	1K	1	
R124	ERJ8GCJ392	3.9K	1		VR7	EVM38GA00B23	2K	1	
R125	ERJ8GCJ102	1K	1		VR8	EVM38GA00B53	5K	1	
R126	ERJ8GCJ392	3.9K	1		VR9	EVM38GA00B52	500	1	
R127	ERJ8GCJ102	1K	1		VR10	EVM38GA00B12	100	1	
R128,129	ERJ8GCJ470	47	2		VR11	EVM38GA00B53	5K	1	
R130,131	ERJ8GCJ487	4.7	2		VR12	EVM38GA00B13	1K	1	
R132	ERJ8GCJ680	68	1		VR20	EVM38GA00B24	20K	1	
R133	ERJ8GCJ392	3.9K	1						
R134	ERD8GCJ153	15K	1				Capacitors		
R135	ERJ8GCJ101	100	1		C1	ECEA1CK470	Electrolytic 16V	47	1
R136	ERJ8GCJ201	200	1		C2	ECEA0JN470	Electrolytic 6.3V	47	1
R137,138	ERJ8GCJ223	22K	2		C3	VCM0009	Semiconductor	270P	1
R139,140	ERJ8GCJ102	1K	2		C4	VCM0010	Semiconductor	400P	1
R141	ERJ8GCJ222	2.2K	1		C5	ECUX1H120JCM	Chip	50V 12P	1
R142	ERJ8GCJ471	470	1		C6	ECEA0JK470	Electrolytic 6.3V	47	1
R143	ERJ8GCJ332	3.3K	1		C7	ECEA1HNR47	Electrolytic 50V	0.47	1
R144	ERJ8GCJ222	2.2K	1		C8	ECEA1CSS221	Electrolytic 10V	220	1
R145	ERJ8GCJ332	3.3K	1		C9	ECUX1H103KBM	Chip	50V 0.01	1
R146	ERJ8GCJ152	1.5K	1		C10	ECEA1CSS101	Electrolytic 16V	100	1
R147	ERJ8GCJ682	6.8K	1		C11-13	ECUX1H103KBM	Chip	50V 0.01	3
R148,149	ERJ8GCJ223	22K	2		C14	VCM0008	Semiconductor	180P	1
R150,151	ERJ8GCJ331	330	2		C15	ECCF1H220JC	Ceramic	50V 22P	1
R152	ERJ8GCJ101	100	1		C16	ECUX1H103KBM	Chip	50V 0.01	1
R153,154	ERJ8GCJ223	22K	2		C17	ECEA1CSS101	Electrolytic 10V	100	1
R155	ERJ8GCJ750	75	1		C18	ECUX1H330KCM	Chip	50V 33P	1
R156	ERJ8GCJ330	33	1		C19,20	ECUX1H103KBM	Chip	50V 0.01	2
R157	ERJ8GCJ183	18K	1		C21,22	ECUX1H270KCM	Chip	50V 27P	2
R158	ERJ8GCJ392	3.9K	1		C23-26	ECUX1H103KBM	Chip	50V 0.01	4
R159	ERJ8GCJ221	220	1		C27	ECEA1CS101	Electrolytic 16V	100	1
R160	ERJ8GCJ102	1K	1		C28,29	ECUX1H103KBM	Chip	50V 0.01	2
R161	ERJ8GCJ561	560	1		C30	ECUX1H270KCM	Chip	50V 27P	1
R162	ERJ8GCJ821	820	1		C32	ECUX1H102KBM	Chip	50V 1000P	1
R163	ERJ8GCJ102	1K	1		C33	ECUX1H103KBM	Chip	50V 0.01	1
R164	ERJ8GCJ182	1.8K	1		C34-36	ECUX1E104MDM	Chip	25V 0.1	3
R165	ERJ8GCJ273	27K	1		C37	ECUX1H103KBM	Chip	50V 0.01	1
R166	ERJ8GCJ123	12K	1		C38	ECEA1CK470	Electrolytic 16V	47	1
R167	ERJ8GCJ222	2.2K	1		C39	ECEA1CS101	Electrolytic 16V	100	1
R168	ERJ8GCJ681	680	1		C40	ECEA1HK010	Electrolytic 50V	1	1
R169,170	ERJ8GCJ222	2.2K	1		C41	ECUX1H471KC	Chip	50V 470P	1
R171	ERJ8GCJ153	15K	1		C42	ECEA1CK100	Electrolytic 16V	10	1
R172	ERJ8GCJ183	18K	1		C43	ECUX1H121KM	Chip	50V 120P	1
R173	ERJ8GCJ560	56	1		C44	ECEA1CK330	Electrolytic 16V	33	1
R174	ERJ8GCJ182	1.8K	1		C45	ECUX1H103KBM	Chip	50V 0.01	1
R175	ERJ8GCJ332	3.3K	1		C46	ECUX1H121KM	Chip	50V 120P	1
R176	ERJ8GCJ821	820	1		C47	ECUX1H101KM	Chip	50V 100P	1
R177,178	ERJ8GCJ102	1K	2		C48	ECEA1CSS221	Electrolytic 16V	100	1
R179	ERJ8GCJ821	820	1		C49	ECUX1H103KBM	Chip	50V 0.01	1
R180	ERJ8GCJ181	180	1		C50	ECEA1CK470	Electrolytic 16V	47	1
R200	ERJ8GCJ103	10K	1		C51	VCM0013	Semiconductor	1200P	1
R224	ERJ8GCJ392	3.9K	1		C52	ECEA1CK470	Electrolytic 16V	47	1
R225	ERJ8GCJ564	560K	1		C53	ECEA0JK470	Electrolytic 6.3V	47	1
R226	ERJ8GCJ682	6.8K	1		C55	ECUX1H103KBM	Chip	50V 0.01	1
R227	ERJ8GCJ102	1K	1		C56	ECEA0JN470S	Electrolytic 6.3V	47	1
R228	ERJ8GCJ183	18K	1		C57	VCM0011	Semiconductor	560P	1
R229	ERJ8GCJ102	1K	1						

Parts List

[illegible]

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VIDEO PROCESSOR BLOCK DIAGRAM

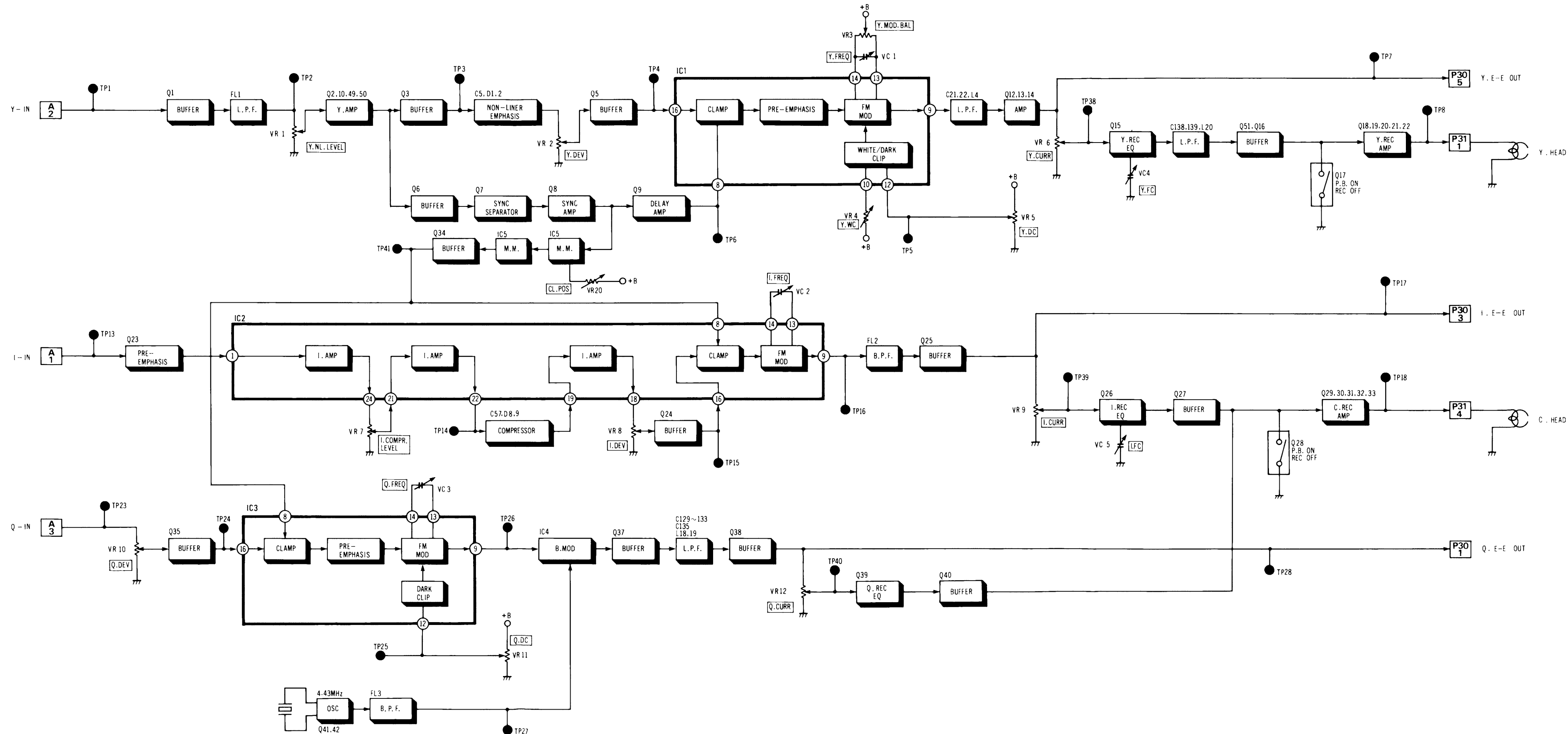
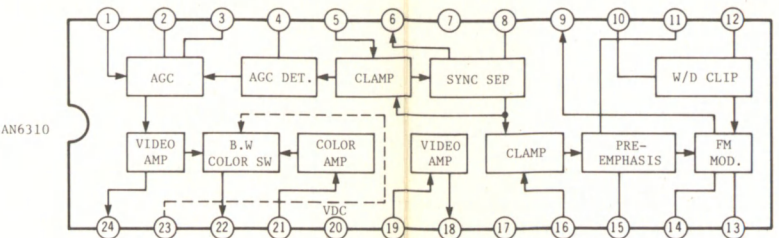
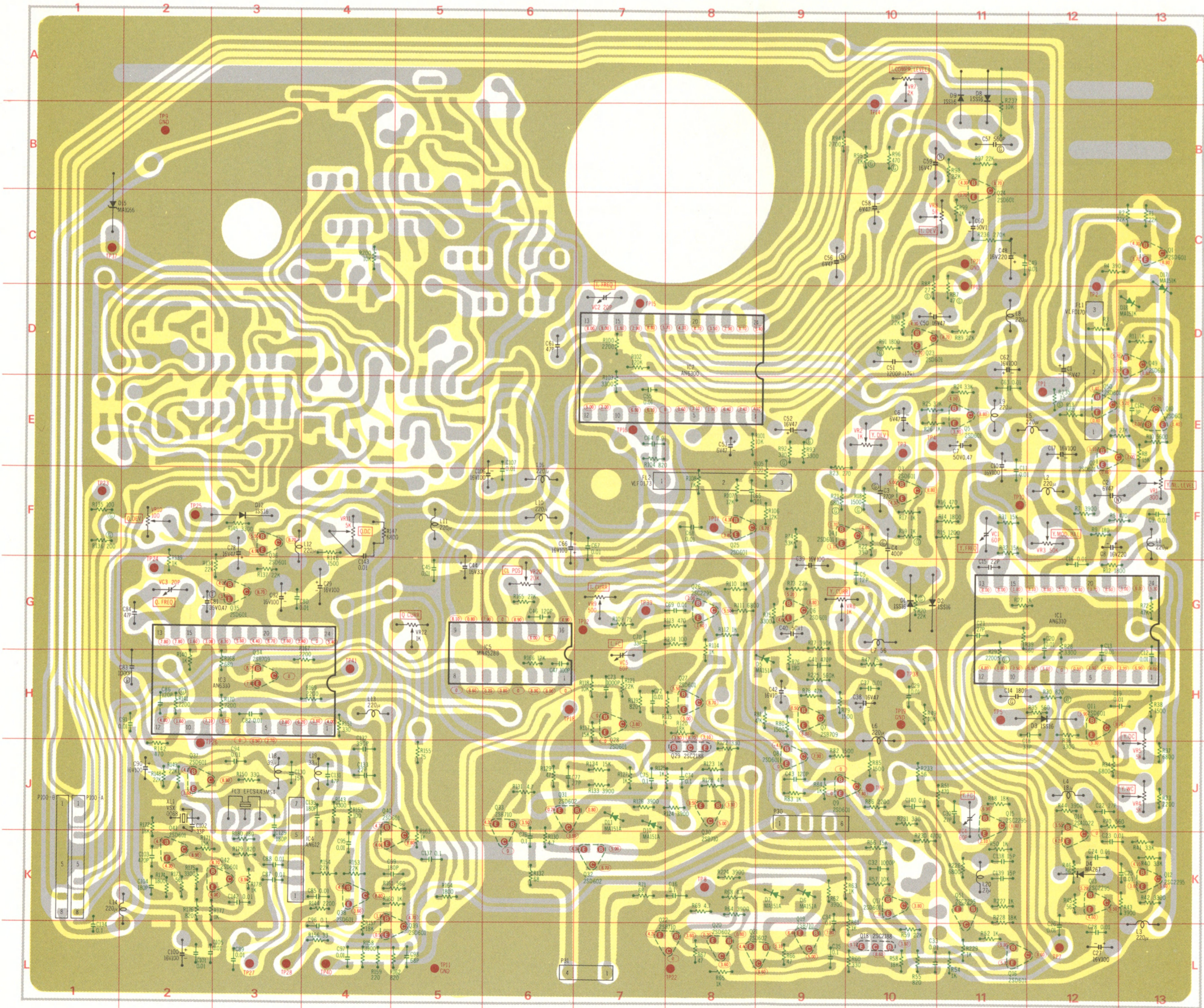


Figure 6-1. Video Processor Block Diagram

VIDEO PROCESSOR P.C. BOARD (VEP03129A)

THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE CIRCLE ○
ON THIS DIAGRAM IS RECORD MODE WITH NTSC COLOR BAR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKET ()
ON THIS DIAGRAM IS PLAYBACK MODE WITH NTSC COLOR BAR SIGNAL.



Video Process C.B.A.

Q1	C-13
Q2	E-12
Q3	F-10
Q4	F-9
Q5	E-11
Q6	G-9
Q7	H-9
Q8	J-9
Q9	J-9
Q10	E-13
Q11	H-12
Q12	K-13
Q13	K-12
Q14	J-12
Q15	J-11
Q16	L-11
Q17	K-10
Q18	L-10
Q19	L-9
Q20	L-8
Q21	L-9
Q22	L-8
Q23	D-10
Q24	B-11
Q25	F-8
Q26	G-8
Q27	H-8
Q28	H-7
Q29	J-8
Q30	J-8
Q31	J-6
Q32	K-7
Q33	J-6
Q34	H-3
Q35	G-3
Q36	F-3
Q37	J-2
Q38	K-4
Q39	L-5
Q40	J-4
Q41	K-2
Q42	K-3
Q49	D-13
Q51	K-11

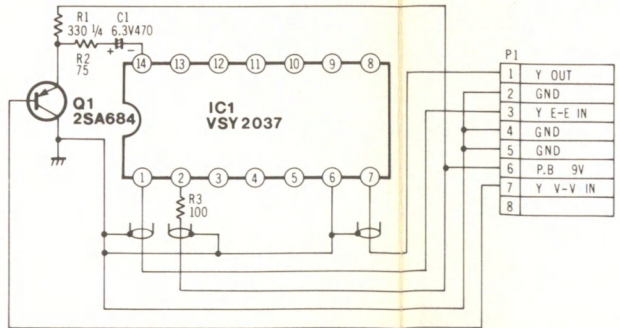
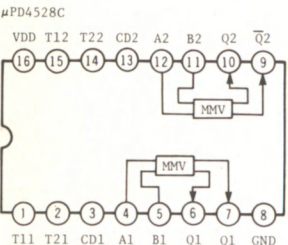


Figure 6-2. Video Processor P.C. Board

VIDEO PROCESSOR SCHEMATIC DIAGRAM

THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ()
ON THIS DIAGRAM IS PLAYBACK MODE WITH NTSC COLOR BAR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ()
ON THIS DIAGRAM IS RECORD MODE WITH NTSC COLOR BAR SIGNAL.

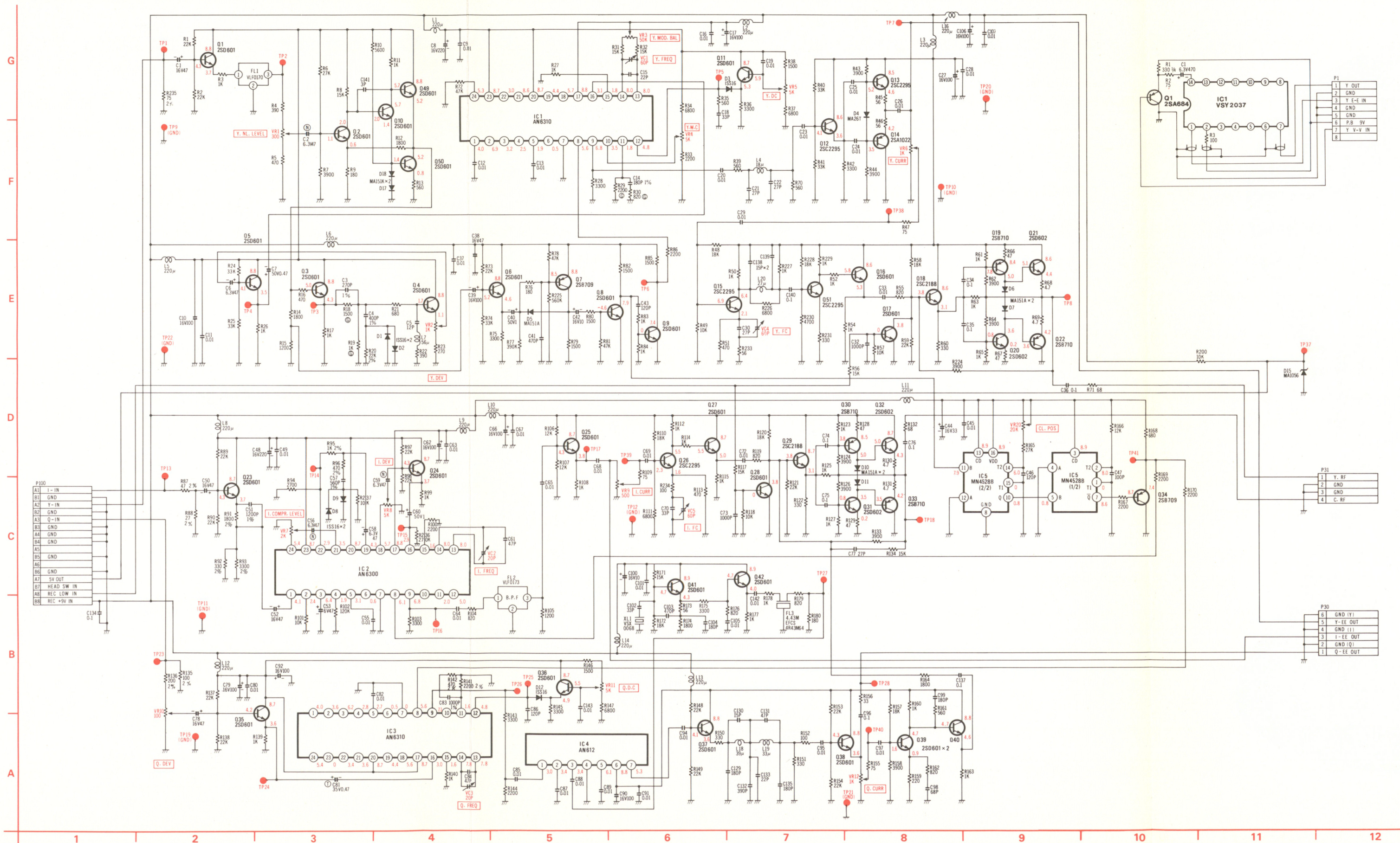


Figure 6-3. Video Processor Schematic Diagram

Service Manual

RECAM™

Portable VTR

AU-100A

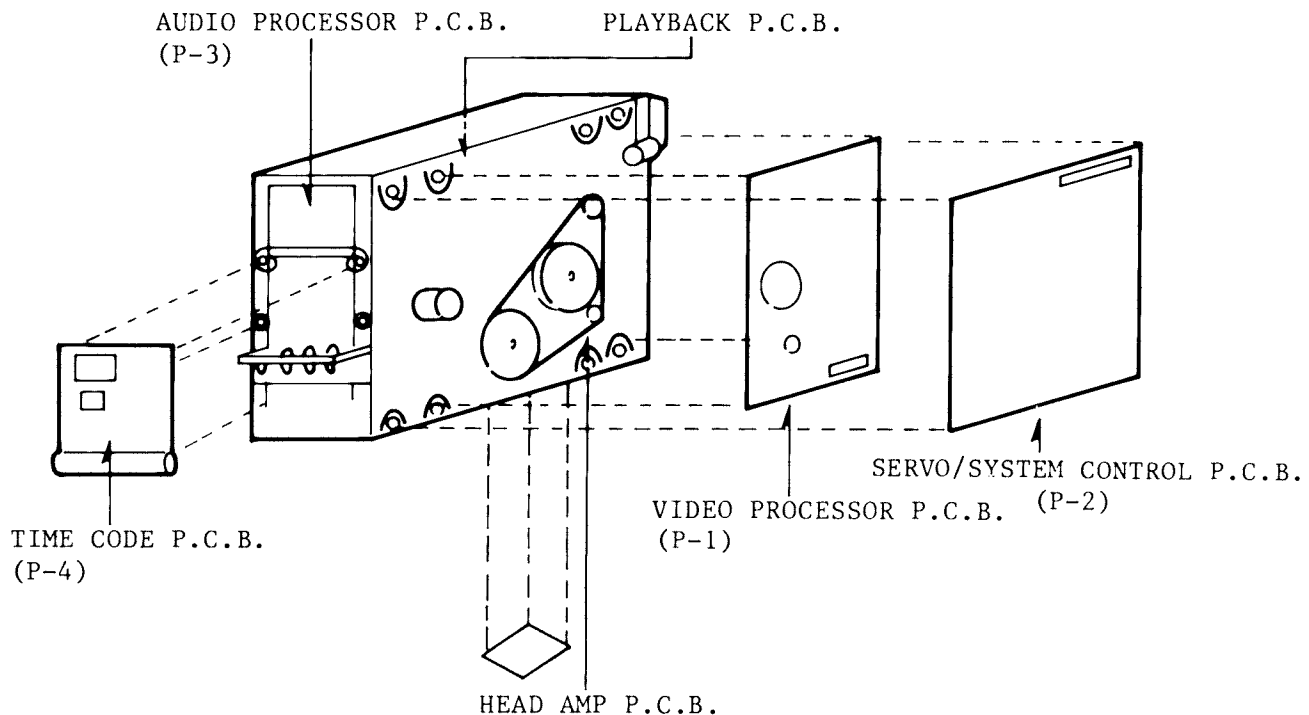


M-VISION™

Servo/System Control Circuit (P2)

- *Electrical Parts List*
- *Block Diagram*
- *Printed Circuit Board*
- *Servo Section*
- *System Control Section*

Servo/System Control C.B.A. (VEP02138A)



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Victoria Industrial Park
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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP02138A	SYSTEM SERVO CONTROL P.C. BOARD			Q80	2SB709	Chip	1	
					Q83	2SD601		1	
					Q84-87	2SD601	Chip	4	
					Q89	2SB709	Chip	1	
		Integrated Circuits			Q90	2SD1051		1	
IC1	BA6122		1		Q91,92	2SB709	Chip	2	
IC2	μPC141C		1		Q93	2SD812		1	
IC3	μPD4081C		1		Q94	2SB747		1	
IC4	μPD4050BC		1		Q95	2SB709	Chip	1	
IC6	μPD4071C		1		Q98,99	2SD601	Chip	2	
IC8	μPC451C		1		Q100	2SB709	Chip	1	
IC9,10	μPD4013BC		2		Q101	2SD601	Chip	1	
IC11	μPC1555C		1		Q103	2SB709	Chip	1	
IC12	ICL8211CPA		1		Q104-107	2SD601	Chip	4	
IC13	μPC1251C		1		Q109	2SD601		1	
IC14	μPD4028BC		1		Q110	2SD602	Chip	1	
IC15	μPD4052BC		1						
IC16,17	μPD4051BC		2						
IC18	MN1599Q		1						
IC19	VSI0052A		1						
IC20	μPC177C		1						
IC21	AN6350		1				Diodes		
IC22	μPD4024BC		1		D1	ERB81004		1	
IC23	AN6341N		1		D2-4	ERB81004G		3	
IC24	μPD4024BC		1		D5	MA1068		1	
IC25,26	μPC1251C		2		D6	MA1082		1	
IC27	AN6677		1		D7	ERZC05DK330		1	
IC28	AN6914		1		D8	MA165		1	
IC29	μPD4013BC		1		D9	OA90		1	
IC30	μPD4066BC		1		D10	MA151K	Chip	1	
IC31	HD14070BP		1		D11,12	MA165		2	
IC32	μPD4528BC		1		D13	MA151A	Chip	1	
IC33	BA634		1		D14-16	MA165		3	
					D17	ERB81004G		1	
		Transistors			D18	MA1047		1	
Q1	2SB868		1		D19-21	MA151K	Chip	3	
Q2	2SB759		1		D22,23	MA151K	Chip	2	
Q3	2SB868		1		D24	MA151A	Chip	1	
Q4	2SB759		1		D25	MA151A	Chip	1	
Q5	2SD601		1		D26-28	MA151A	Chip	3	
Q7	2SC1383		1		D29	MA151K	Chip	1	
Q8	2SA886V		1		D30	MA151K	Chip	1	
Q9	2SA684		1		D31	MA151A	Chip	1	
Q10,11	2SB868		2		D32	MA151A	Chip	1	
Q12	2SD601A	Chip	1		D33	MA151K	Chip	1	
Q13,14	2SD960		2		D34	MA151A	Chip	1	
Q15	2SD601A	Chip	1		D35	MA151K	Chip	1	
Q16,17	2SB819		2		D36-44	MA151K	Chip	9	
Q18	2SD601	Chip	1		D45	OA90		1	
Q19,20	2SD1051		2						
Q21,22	2SD601	Chip	2				Resistors		
Q23	2SB747		1		R1	ERJ8GCJ223	22K	1	
Q24	2SD602	Chip	1		R2	ERJ8GCJ333	33K	1	
Q27	2SD601	Chip	1		R3	ERJ8GCJ393	39K	1	
Q30	2SD601		1		R4	ERJ8GCJ222	2.2K	1	
Q31,32	2SB819		2		R5	ERJ8GCJ103	10K	1	
Q33	2SD601	Chip	1		R6	ERJ8GCJ221	220	1	
Q34,35	2SD1051		2		R7	ERJ8GCJ473	47K	1	
Q36-38	2SD601	Chip	3		R8	ERG12ANJ561	560	1	
Q39	2SB868		1		R9	ERK12ANJR47	1/2W 0.47	1	
Q40-48	2SD601	Chip	9		R10	ERJ8GCJ103	10K	1	
Q49-53	2SB709	Chip	5		R11	ERJ8GCJ272	2.7K	1	
Q55-57	2SD601	Chip	3		R12	ERJ8GCJ562	5.6K	1	
Q59	2SD601	Chip	1		R13	ERJ8GCJ392	3.9K	1	
Q60	2SB710		1		R14	ERK12ANJR47	1/2W 0.47	1	
Q61	2SD601		1		R15	ERD25TJ561	1/4W 560	1	
Q63-71	2SD601	Chip	9		R16	ERJ8GCJ151	150	1	
Q74	2SB710	Chip	1		R17	ERJ8GCJ473	47K	1	
Q75-79	2SD602	Chip	5		R18	ERJ8GCJ223	22K	1	

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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R19,20	ERJ8GCJ102		1K 2		R121	ERJ8GCJ472	4.7K	1	
R21	ERJ8GCJ101		100 1		R122	ERJ8GCJ471	470	1	
R22	ERX12ANJ180	1/2W	1.0 1		R123,124	ERJ8GCJ472	4.7K	2	
R23	ERJ8GCJ102		1K 1		R125,126	ERJ8GCJ471	470	2	
R24	ERJ8GCJ103		10K 1		R127,128	ERJ8GCJ472	4.7K	2	
R25,26	ERJ8GCJ102		1K 2		R129,130	ERJ8GCJ471	470	2	
R27	ERG12ANJ271	1/2W	270 1		R131	ERJ8GCJ472	4.7K	1	
R28	ERG1ANJ220	1W	22 1		R132,133	ERJ8GCJ473	47K	2	
R29	ERG12ANJ271	1/2W	270 1		R134	ERJ8GCJ102	1K	1	
R30	ERJ8GCJ102		1K 1		R135,136	ERJ8GCJ473	47K	2	
R31	ERJ8GCJ473		47K 1		R137	ERJ8GCJ102	1K	1	
R32,33	ERJ8GCJ102		1K 2		R138,139	ERJ8GCJ473	47K	2	
R34	ERJ8GCJ473		47K 1		R140	ERJ8GCJ102	1K	1	
R35	ERJ8GCJ102		1K 1		R141,142	ERJ8GCJ473	47K	2	
R36	ERJ8GCJ471		470 1		R143	ERJ8GCJ223	22K	1	
R37	ERJ8GCJ102		1K 1		R144	ERJ8GCJ473	47K	1	
R38	ERJ8GCJ471		470 1		R145,146	ERJ8GCJ102	1K	2	
R39	ERJ8GCJ153		15K 1		R148	ERJ8GCJ123	12K	1	
R40	ERJ8GCJ563		56K 1		R150	ERJ8GCJ474	470K	1	
R41	ERJ8GCJ473		47K 1		R151	ERJ8GCJ104	100K	1	
R42	ERJ8GCJ562	5.6K	1 1		R152	ERJ8GCJ103	10K	1	
R43	ERJ8GCJ473		47K 1		R153	ERJ8GCJ334	330K	1	
R44	ERJ8GCJ103		10K 1		R154	ERJ8GCJ563	56K	1	
R45-47	ERJ8GCJ473		47K 4		R155,156	ERJ8GCJ272	2.7K	2	
R48	ERJ8GCJ562	5.6K	1 1		R157	ERJ8GCJ333	33K	1	
R49	ERJ8GCJ102		1K 1		R161-163	ERJ8GCJ563	56K	3	
R50	ERJ8GCJ471		470 1		R164	ERJ8GCJ103	10K	1	
R51	ERJ8GCJ102		1K 1		R165	ERJ8GCJ472	4.7K	1	
R53	ERJ8GCJ153		15K 1		R166	ERJ8GCJ333	33K	1	
R54	ERJ8GCJ562	5.6K	1 1		R167,168	ERJ8GCJ103	10K	2	
R55	ERJ8GCJ683		68K 1		R169	ERJ8GCJ472	4.7K	1	
R56-60	ERJ8GCJ473		47K 5		R170	ERJ8GCJ103	10K	1	
R61,62	ERJ8GCJ563		56K 2		R171	ERJ8GCJ333	33K	1	
R63	ERJ8GCJ473		47K 1		R172	ERJ8GCJ822	8.2K	1	
R64	ERJ8GCJ272	2.7K	1 1		R173	ERJ8GCJ104	100K	1	
R65	ERJ8GCJ561		560 1		R174	ERJ8GCJ333	33K	1	
R66	ERJ8GCJ105		1M 1		R175	ERJ8GCJ334	330K	1	
R67	ERJ8GCJ101		100 1		R176-178	ERJ8GCJ563	56K	3	
R68	ERD25TJ101	1/4W	100 1		R179	ERJ8GCJ334	330K	1	
R69	ERJ8GCJ103		10K 1		R180	ERJ8GCJ104	100K	1	
R70,71	ERJ8GCJ473		47K 2		R181-183	ERJ8GCJ563	56K	3	
R72	ERJ8GCJ103		10K 1		R184	ERJ8GCJ473	47K	1	
R73	ERJ8GCJ473		47K 1		R185	ERJ8GCJ182	1.8K	1	
R74-80	ERJ8GCJ563		56K 7		R186	ERD25TJ220	1/4W 22	1	
R81	ERJ8GCJ103		10K 1		R187	ERJ8GCJ563	56K	1	
R82	ERJ8GCJ104		100K 1		R189	ERJ8GCJ563	56K	1	
R83	ERJ8GCJ563		56K 1		R192	ERJ8GCJ563	56K	1	
R84	ERJ8GCJ184		180K 1		R193,194	ERJ8GCJ104	100K	2	
R85	ERJ8GCJ104		100K 1		R195	ERJ8GCJ105	1M	1	
R86	ERJ8GCJ102		1K 1		R196	ERJ8GCJ104	100K	1	
R87	ERJ8GCJ563		56K 1		R197	ERJ8GCJ102	1K	1	
R88,89	ERJ8GCJ104		100K 2		R198	ERJ8GCJ223	22K	1	
R90	ERJ8GCJ563		56K 1		R199,200	ERJ8GCJ473	47K	2	
R91	ERJ8GCJ472	4.7K	1 1		R201	ERJ8GCJ223	22K	1	
R92	ERJ8GCJ471		470 1		R202,203	ERJ8GCJ473	47K	2	
R93	ERD10TJ182	1.8K	1 1		R204	ERJ8GCJ222	2.2K	1	
R95,96	ERJ8GCJ103		10K 2		R205	ERJ8GCJ561	560	1	
R97,98	ERJ8GCJ563		56K 2		R206-208	ERJ8GCJ5R8	5.8	3	
R99	ERJ8GCJ103		10K 1		R209,210	ERJ8GCJ103	10K	2	
R100	ERJ8GCJ563		56K 1		R211	ERJ8GCJ273	27K	1	
R101	ERJ8GCJ103		10K 1		R212	ERJ8GCJ103	10K	1	
R102-108	ERJ8GCJ563		56K 7		R213	ERJ8GCJ473	47K	1	
R109	ERJ8GCJ471		470 1		R214	ERJ8GCJ334	330K	1	
R110,111	ERJ8GCJ472	4.7K	2 2		R215	ERJ8GCJ823	82K	1	
R112,113	ERJ8GCJ471		470 2		R216	ERJ8GCJ103	10K	1	
R114	ERJ8GCJ472	4.7K	1 1		R217	ERJ8GCJ223	22K	1	
R115	ERJ8GCJ471		470 1		R218	ERJ8GCJ334	330K	1	
R116	ERJ8GCJ472	4.7K	1 1		R219,220	ERJ8GCJ103	10K	2	
R118	ERJ8GCJ472	4.7K	1 1		R222	ERJ8GCJ563	56K	1	
R119,120	ERJ8GCJ471		470 2		R223	ERJ8GCJ473	47K	1	

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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R224	ERJ8GCJ333	33K	1		R304	ERJ8GCJ472	6.8K	1	
R225	ERJ8GCJ184	180K	1		R305	ERJ8GCJ393	39K	1	
R226	ERJ8GCJ273	27K	1		R306,307	ERJ8GCJ393	39K	2	
R227	ERJ8GCJ153	15K	1		R308,309	ERJ8GCJ105	1M	2	
R228	ERJ8GCJ563	56K	1		R310	ERJ8GCJ683	68K	1	
R229	ERJ8GCJ392	3.9K	1		R311,312	ERJ8GCJ563	56K	2	
R230,231	ERJ8GCJ563	56K	2		R313	ERJ8GCJ824	820K	1	
R232	ERJ8GCJ104	100K	1		R314	ERJ8GCJ103	10K	1	
R233	ERJ8GCJ123	12K	1		R315	ERJ8GCJ563	56K	1	
R234	ERJ8GCJ223	22K	1		R316	ERJ8GCJ473	47K	1	
R235	ERJ8GCJ682	6.8K	1		R317	ERJ8GCJ105	1M	1	
R236	ERJ8GCJ333	33K	1		R318,319	ERJ8GCJ333	33K	2	
R237,238	ERJ8GCJ153	15K	2		R320	ERJ8GCJ822	8.2K	1	
R239	ERJ8GCJ184	180K	1		R321	ERJ8GCJ563	56K	1	
R240	ERJ8GCJ273	27K	1		R322	ERJ8GCJ332	3.3K	1	
R241,242	ERJ8GCJ683	68K	2		R323-327	ERJ8GCJ473	47K	5	
R243	ERJ8GCJ473	47K	1		R328	ERJ8GCJ822	8.2K	1	
R244	ERJ8GCJ563	56K	1		R329	ERJ8GCJ473	47K	1	
R245,246	ERJ8GCJ473	47K	2		R330	ERJ8GCJ103	10K	1	
R247,248	ERJ8GCJ563	56K	2		R331,332	ERJ8GCJ473	47K	2	
R249	ERJ8GCJ472	4.7K	1		R333	ERJ8GCJ153	15K	1	
R250	ERJ8GCJ682	6.8K	1		R334	ERJ8GCJ823	82K	1	
R251	ERJ8GCJ103	10K	1		R335-337	ERJ8GCJ220	22	3	
R252	ERJ8GCJ563	56K	1		R338	ERX12ANJR68	1/2W 0.68	1	
R253-255	ERJ8GCJ473	47K	3		R339	ERJ8GCJ152	1.5K	1	
R256	ERJ8GCJ392	3.9K	1		R340	ERJ8GCJ561	56K	1	
R257	ERJ8GCJ123	12K	1		R341	ERJ8GCJ153	15K	1	
R258	ERJ8GCJ223	22K	1		R342	ERJ8GCJ471	47K	1	
R259	ERJ8GCJ154	150K	1		R343	ERJ8GCJ273	27K	1	
R260	ERJ8GCJ103	10K	1		R344	ERJ8GCJ102	1K	1	
R261	ERX12ANJR47	1/2W 0.47	1		R345	ERJ8GCJ103	10K	1	
R262	ERJ8GCJ103	10K	1		R346	ERJ8GCJ562	5.6K	1	
R263	ERJ8GCJ333	33K	1		R347	ERJ8GCJ563	56K	1	
R264	ERJ8GCJ333	33K	1		R348	ERJ8GCJ473	47K	1	
R265	ERJ8GCJ154	150K	1		R349	ERJ8GCJ333	33K	1	
R266	ERJ8GCJ102	1K	1		R350	ERJ8GCJ223	22K	1	
R267	ERJ8GCJ155	1.5M	1		R351	ERJ8GCJ392	3.9K	1	
R268	ERJ8GCJ472	4.7K	1		R352	ERJ8GCJ682	6.8K	1	
R269	ERJ8GCJ683	68K	1		R353	ERJ8GCJ102	1K	1	
R270	ERJ8GCJ273	27K	1		R354	ERJ8GCJ823	82K	1	
R271	ERJ8GCJ104	100K	1		R355	ERJ8GCJ104	100K	1	
R272	ERJ8GCJ124	120K	1		R356,357	ERJ8GCJ332	3.3K	2	
R273	ERJ8GCJ392	3.9K	1		R358	ERJ8GCJ471	47K	1	
R274	ERJ8GCJ822	8.2K	1		R359,360	ERJ8GCJ563	56K	2	
R275	ERJ8GCJ682	6.8K	1		R361	ERJ8GCJ105	1M	1	
R276	ERJ8GCJ103	10K	1		R369	ERJ8GCJ273	27K	1	
R277,278	ERJ8GCJ473	47K	2		R370,371	ERJ8GCJ103	10K	2	
R279	ERD10TJ103	10K	1		R372	ERJ8GCJ563	56K	1	
R280	ERJ8GCJ823	82K	1		R373-375	ERJ8GCJ103	10K	3	
R281	ERJ8GCJ333	33K	1		R376	ERJ8GCJ104	100K	1	
R282	ERJ8GCJ105	1M	1		R377	ERJ8GCJ103	10K	1	
R283	ERJ8GCJ102	1K	1		R378	ERJ8GCJ393	39K	1	
R284	ERJ8GCJ104	100K	1		R379	ERJ8GCJ823	82K	1	
R285	ERJ8GCJ152	1.5K	1		R381	ERJ8GCJ563	56K	1	
R286	ERJ8GCJ182	1.8K	1		R383	ERJ8GCJ103	10K	1	
R287	ERJ8GCJ392	390K	1		R387	ERJ8GCJ103	10K	1	
R288	ERJ8GCJ685	6.8M	1		R388	ERD25TJ471	1/4W 470	1	
R289	ERJ8GCJ332	3.3K	1		R390	ERJ8GCJ153	15K	1	
R290	ERJ8GCJ104	100K	1		R391	ERJ8GCJ563	56K	1	
R291	ERJ8GCJ473	47K	1		R392	ERJ8GCJ473	47K	1	
R292	ERJ8GCJ823	82K	1		R397-399	ERJ8GCJ103	10K	3	
R293	ERJ8GCJ333	33K	1		R400	ERD10TJ563	56K	1	
R294,295	ERJ8GCJ563	56K	2		R405	ERJ8GCJ392	3.9K	1	
R296,297	ERJ8GCJ473	47K	2		R406	ERJ8GCJ183	18K	1	
R298	ERJ8GCJ103	10K	1		R407	ERJ8GCJ565	5.6M	1	
R299	ERJ8GCJ472	4.7K	1		R408,409	ERJ8GCJ473	47K	2	
R300	ERJ8GCJ222	2.2K	1		R410	ERJ8GCJ563	56K	1	
R301	ERJ8GCJ683	68K	1		R411	ERJ8GCJ153	15K	1	
R302	ERJ8GCJ683	68K	1		R412,413	ERJ8GCJ222	2.2K	2	
R303	ERJ8GCJ184	180K	1		R414	ERJ8GCJ392	3.9K	1	

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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
R415	ERJ8GCJ123	12K	1		C60-62	ECUX1H103KBM	Chip 50V 0.01	3	
R416	ERJ8GCJ392	3.9K	1		C63	ECEA1CK100	Electrolytic 16V 10	1	
R417	ERJ8GCJ183	18K	1		C64	ECUV1H330KCM	Chip 50V 33P	1	
R418	ERJ8GCJ473	47K	1		C65	ECUV1H101KCM	Chip 50V 100P	1	
R419	ERJ8GCJ154	150K	1		C66	ECUX1H103KBM	Chip 50V 0.01	1	
R421	ERD10TJ103	10K	1		C67	ECEA1CK100	Electrolytic 16V 10	1	
R422	ERJ8GCJ223	22K	1		C68	ECUX1H102KBM	Chip 50V 1000P	1	
					C69	ECEA1CK100	Electrolytic 16V 10	1	
					C70	ECUX1H472KBM	Chip 50V 4700P	1	
					C71	ECEA1HCR33	Electrolytic 50V 0.33	1	
					C72	ECUX1H103KBM	Chip 50V 0.01	1	
		Variable Resistors			C73	ECEA1CK100	Electrolytic 16V 10	1	
VR1	EVM38GA00B23	2K	1		C74-76	ECEA1HKN010	Electrolytic 50V 1	3	
VR2	EVM38GA00B33	3K	1		C77	ECEA1CSS101	Electrolytic 16V 100	1	
VR3	EVM38GA00B14	10K	1		C78	ECQE1103KN	Mylar 100V 0.01	1	
VR4	EVM38GA00B23	2K	1		C79	ECQE1333KN	Mylar 100V 0.033	1	
VR6,7	EVM38GA00B24	10K	2		C80	ECSF35E3R3	Tantalum 35V 3.3	1	
VR9	EVM38GA00B15	100K	1		C81	ECQM1H822KZ	Mylar 50V 8200P	1	
VR10	EVM38GA00B24	20K	1		C82-84	ECEA1HCR22	Electrolytic 50V 0.22	3	
VR11	EVM38GA00B14	10K	1		C85	ECEA1HCR33	Electrolytic 50V 0.33	1	
VR12,13	EVM38GA00B54	50K	2		C86	ECEA1HKO10	Electrolytic 50V 1	1	
VR14	EVM38GA00B15	100K	1		C87	ECEA1EK3R3	Electrolytic 25V 3.3	1	
VR15,16	EVM38GA00B54	50K	2		C88	ECEA1CK470	Electrolytic 16V 47	1	
					C89	ECUX1H103KBM	Chip 50V 0.01	1	
					C90	ECKF1H103KB	Ceramic 50V 0.01	1	
					C91	ECEA1EK3R3	Electrolytic 25V 3.3	1	
					C92	ECUX1E223KBM	Chip 25V 0.22	1	
					C93	ECEA1CK100	Electrolytic 16V 10	1	
		Capacitors			C94	ECEA1HKN010	Electrolytic 50V 1	1	
C1	ECEA1ESS221	Electrolytic 25V 220	1		C95	ECEA1HKNR47	Electrolytic 50V 0.47	1	
C2	ECUX1H681KM	Chip 50V 680	1		C96	ECEA1CK470	Electrolytic 16V 47	1	
C3	ECEA1HKO10	Electrolytic 50V 1	1		C97	ECQP1104JZ	Mylar 100V 0.01	1	
C4	ECEA1CK330	Electrolytic 16V 33	1		C98	ECQP1393JZ	Mylar 100V 0.039	1	
C5	ECEA1CS221	Electrolytic 16V 220	1		C99	ECQE1104KN	Mylar 100V 0.1	1	
C6	ECEA1CS471	Electrolytic 16V 470	1		C100	ECQE1103KN	Mylar 100V 0.01	1	
C7	ECUX1H152KBM	Chip 50V 1500P	1		C101	ECEA1HKO10	Electrolytic 50V 1	1	
C8	ECEA1CS221	Electrolytic 16V 220	1		C102	ECEA1HNO10	Electrolytic 50V 1	1	
C9	ECUX1H152KBM	Chip 50V 1500P	1		C103	ECSF35ER22	Tantalum 35V 0.22	1	
C10	ECEA1AS471	Electrolytic 10V 470	1		C104	ECQE1104KN	Mylar 100V 0.1	1	
C11	ECEA1AS221	Electrolytic 10V 220	1		C105	ECUX1H101KM	Chip 50V 100P	1	
C12	ECUX1H390KCM	Chip 50V 39P	1		C106	ECQE1104KN	Mylar 100V 0.1	1	
C13	ECEA1CSS101	Electrolytic 16V 100	1		C107	ECEA1CK470	Electrolytic 16V 47	1	
C14,15	ECEA1CK470	Electrolytic 16V 47	2		C108	ECEA1CK470	Electrolytic 6.3V 47	1	
C16	ECUX1H103KBM	Chip 50V 0.01	1		C109	ECEA1HKO10	Electrolytic 50V 1	1	
C17	ECEA1ASS221	Electrolytic 10V 220	1		C110	ECEA1HCR22	Electrolytic 50V 0.22	1	
C18-20	ECUX1H103KBM	Chip 50V 0.01	3		C111	ECUX1H103KBM	Chip 50V 0.01	1	
C21	ECEA1HKO10	Electrolytic 50V 1	1		C112	ECEA1HKO10	Electrolytic 50V 1	1	
C22	ECUX1H103KBM	Chip 50V 0.01	1		C113,114	ECUX1H103KBM	Chip 50V 0.01	2	
C23	ECEA1HKO10	Electrolytic 50V 1	1		C115	ECEA1CK470	Electrolytic 16V 47	1	
C24	ECUX1H221KM	Chip 50V 220P	1		C116	ECEA1HKO1	Electrolytic 50V 0.1	1	
C25	ECEA1ESS101	Electrolytic 25V 100	1		C117,118	ECEA1CK470	Electrolytic 16V 47	2	
C26	ECUX1H102KBM	Chip 50V 1000P	1		C119	ECSF35ER22	Tantalum 35V 0.22	2	
C27	ECUX1H101KCM	Chip 50V 100P	1		C120	ECEA1CK470	Electrolytic 16V 47	1	
C28	ECEA1CSS101	Electrolytic 16V 100	1		C121	ECUX1E223KBM	Chip 25V 0.022	1	
C29	ECEA1HKO1	Electrolytic 50V 0.1	1		C122	ECEA1CK220	Electrolytic 16V 22	1	
C30	ECUX1H103KBM	Chip 50V 0.01	1		C123,124	ECQE1104KN	Mylar 100V 0.1	2	
C31	ECEA1HKO10	Electrolytic 50V 1	1		C125	ECQM1H103KZ	Mylar 50V 0.01	1	
C32	ECUX1H103KBM	Chip 50V 0.01	1		C126	ECQM1H124KV	Mylar 50V 0.12	1	
C33	ECEA1HKO10	Electrolytic 50V 1	1		C127	ECQM1H682KZ	Mylar 50V 6800P	1	
C34-36	ECUX1H103KBM	Chip 50V 0.01	3		C128	ECEA1CK470	Electrolytic 16V 47	1	
C37	ECEA1CK470	Electrolytic 16V 47	1		C129	ECEA1ASS101	Electrolytic 10V 100	1	
C38	ECUX1H103KBM	Chip 50V 0.01	1		C130,131	ECQE1104KN	Mylar 100V 0.1	2	
C39	ECEA1CK470	Electrolytic 16V 47	1		C132	ECQM1H153KZ	Mylar 50V 0.015	1	
C40-50	ECUX1H103KBM	Chip 50V 0.01	11		C133,134	ECQE1333KN	Mylar 100V 0.033	2	
C51	ECEA1CK100	Electrolytic 16V 10	1		C135,136	ECEA1HKO10	Electrolytic 50V 1	2	
C52,53	ECEA1HKO10	Electrolytic 50V 1	2		C137	ECSF35ER33	Tantalum 35V 0.33	1	
C56	ECUX1H103KBM	Chip 50V 0.01	1		C138	ECUX1H471KM	Chip 50V 470P	1	
C57	ECEA1CK100	Electrolytic 16V 10	1		C139	ECUX1H560KM	Chip 50V 56P	1	
C58	ECUX1H682KBM	Chip 50V 6800P	1		C140	ECUX1H331KM	Chip 50V 330P	1	
C50	ECEA1CK100	Electrolytic 16V 10	1		C141	ECUX1H821KM	Chip 50V 820P	1	

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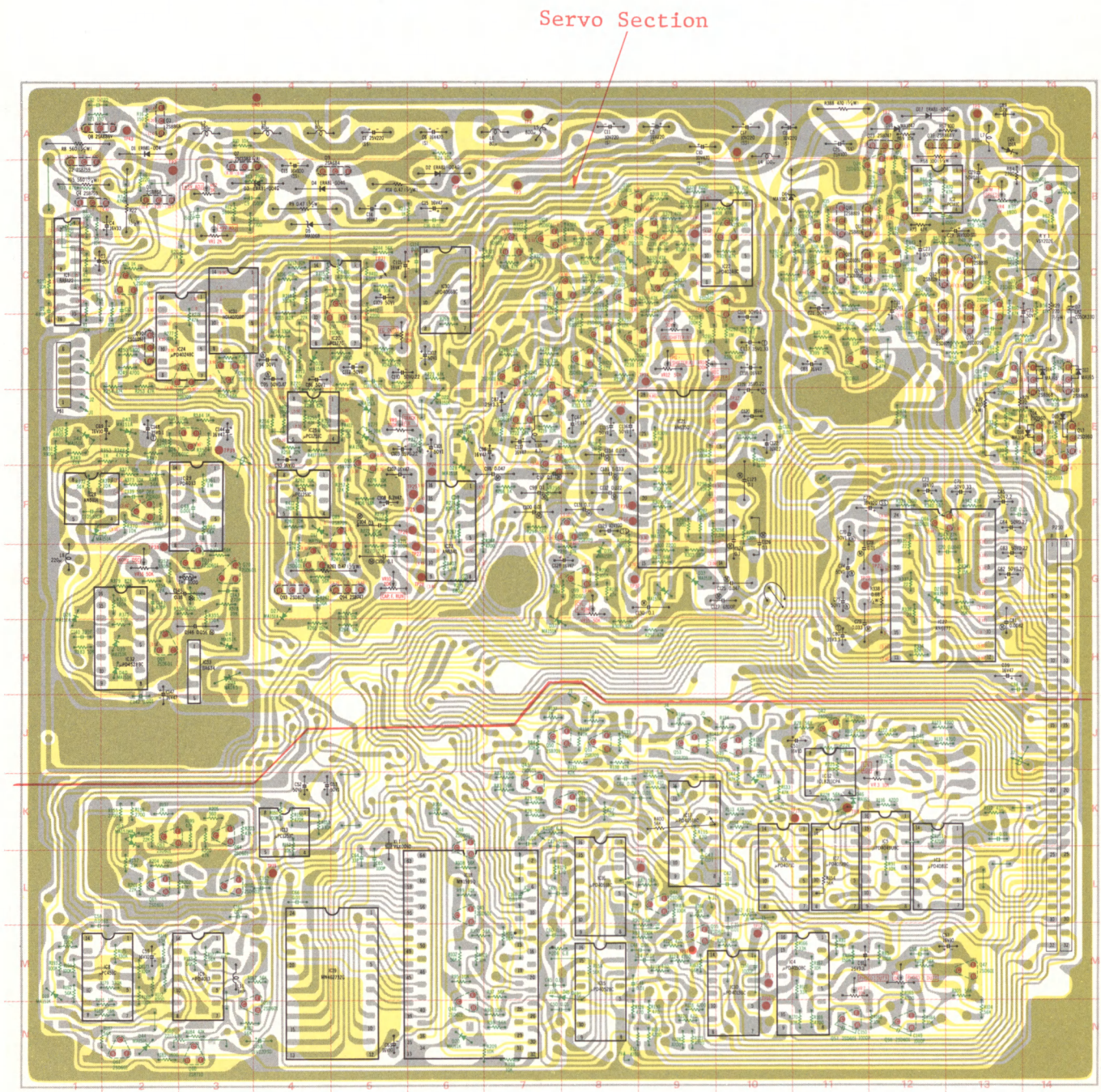
Parts List

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Servo Circuit (part of P2 Board)

- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

Servo Section (VEP02138A) (part of P2 Board)



DRUM SERVO BLOCK DIAGRAM

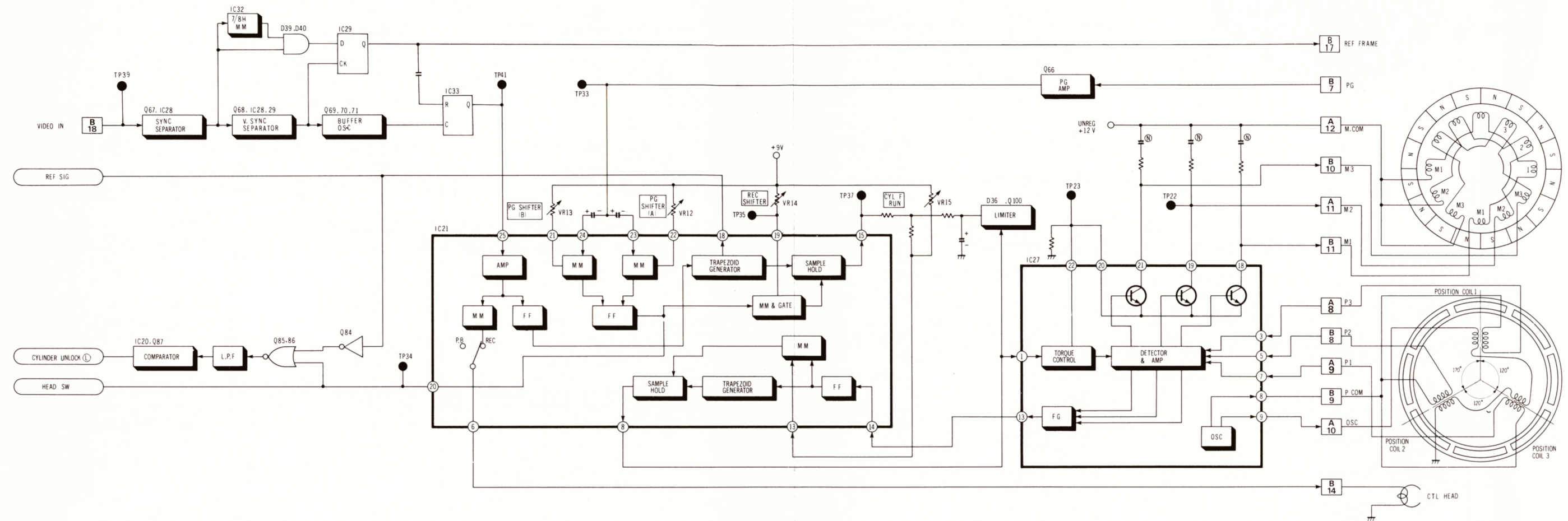


Figure 7-3. DRUM SERVO Block Diagram

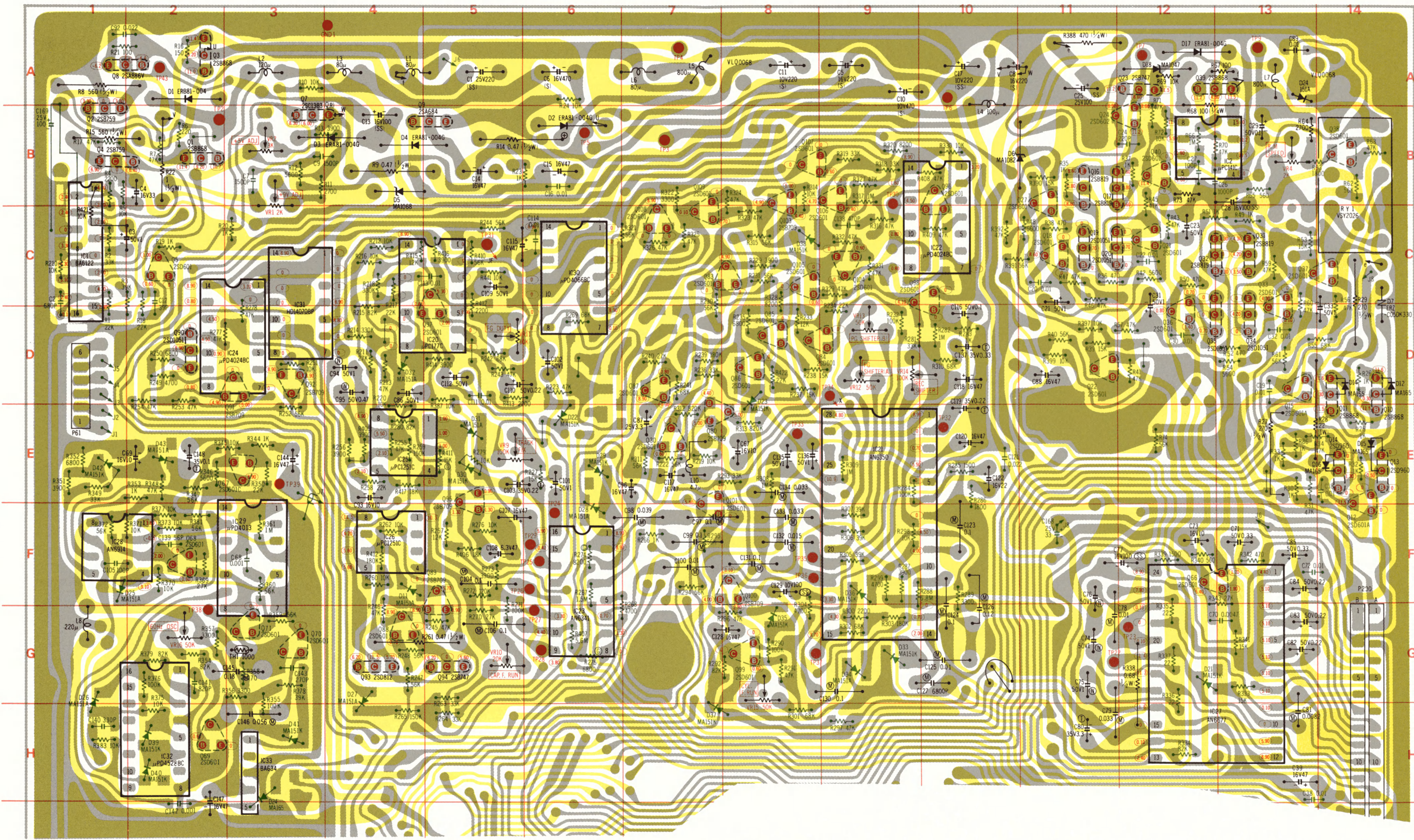
The schematic diagram illustrates the control system for a motor drive. Key components and their interconnections include:

- Inputs and Initial Stages:**
 - REF. SIG** and **CAP UNLOCK** are inputs to **IC 31**, which consists of two **IC 20** comparators.
 - IC 20** outputs E_H and E_L are connected to the control logic.
 - REC H** and **P.B.** are push-button inputs connected to **IC 24** (1/4 DIVIDER) and **IC 22** (1/64 DIVIDER).
- Control Logic and Timing:**
 - IC 24** and **IC 22** provide timing and division functions.
 - IC 21** (CTL AMP) receives inputs from **IC 22** and **B14** (CTL HEAD).
 - IC 20** (LIMITER) and **Q97** (FG AMP) are part of the feedback and monitoring circuitry.
- Motor Drive Section:**
 - IC 23** is a central control IC with multiple pins (15, 14, 13, 12, 11, 9, 8, 7, 3) connected to various functional blocks.
 - Functional Blocks:**
 - A.M.P.** (Amplifier) and **F.F.** (Flip-Flop) are connected to pins 15 and 14 of **IC 23**.
 - M.M.** (Motor Monitor) blocks are connected to pins 13 and 12.
 - TRAPEZOID GENERATOR** and **SAMPLE HOLD** blocks are connected to pins 11 and 9.
 - TRAPEZOID GENERATOR** and **SAMPLE HOLD** blocks are also connected to pins 8 and 7.
 - Power and Protection:**
 - Q95, Q93, Q94** (MOTOR DRIVE) is connected to the output of the motor drive section.
 - Q95, Q93, Q94** is connected to **IC 25** (AMP) and **IC 26, Q93, Q94** (MOTOR DRIVE).
 - Q95, Q93, Q94** is connected to **IC 25** (AMP) and **IC 26, Q93, Q94** (MOTOR DRIVE).
 - Q95, Q93, Q94** is connected to **IC 25** (AMP) and **IC 26, Q93, Q94** (MOTOR DRIVE).

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SERVO CONTROL P.C. BOARD (VEP02138A) [SERVO SECTION]

THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE CIRCLE ○ ON THIS DIAGRAM IS RECORD MODE WITH NTSC COLOR BAR SIGNAL. THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS () ON THIS DIAGRAM IS PLAYBACK MODE WITH NTSC COLOR BAR SIGNAL.



Servo & System Control C.B.A.		
Servo Section		
Q1	B-2	
Q2	B-1	
Q3	A-2	
Q4	B-1	
Q5	C-2	
Q7	B-3	
Q8	A-1	
Q9	B-5	
Q10	E-14	
Q11	E-14	
Q12	F-14	
Q13	E-14	
Q14	E-14	
Q15	D-13	
Q16	B-11	
Q17	B-11	
Q18	C-11	
Q19	C-11	
Q20	C-11	
Q21	C-12	
Q22	D-11	
Q23	A-12	
Q24	B-12	
Q27	B-11	
Q30	E-7	
Q31	C-13	
Q32	C-12	
Q33	C-13	
Q34	D-13	
Q35	D-12	
Q36	D-36	
Q37	C-14	
Q38	B-14	
Q39	A-12	
Q40	B-12	
Q66	F-12	
Q67	E-3	
Q68	F-2	
Q69	H-2	
Q70	G-3	
Q71	G-3	
Q80	E-7	
Q83	C-8	
Q84	D-8	
Q85	D-8	
Q86	D-8	
Q87	D-7	
Q88	G-4	
Q89	F-5	
Q90	D-2	
Q91	D-3	
Q92	D-3	
Q93	G-4	
Q94	G-5	
Q95	E-5	
Q96	B-10	
Q97	D-5	
Q98	C-10	
Q99	G-8	
Q100	F-8	
Q101	E-7	
Q103	C-8	
Q104	C-9	
Q105	C-8	
Q106	B-9	
Q107	B-8	
Q108	C-7	
Q109	B-7	
IC1	C-1	
IC2	B-13	
IC20	D-5	
IC21	E-9	
IC22	C-10	
IC23	G-6	
IC24	D-3	
IC25	E-4	
IC26	F-4	
IC27	H-13	
IC28	F-1	
IC29	F-3	
IC30	C-6	
IC31	D-3	
IC32	H-2	
IC33	H-3	

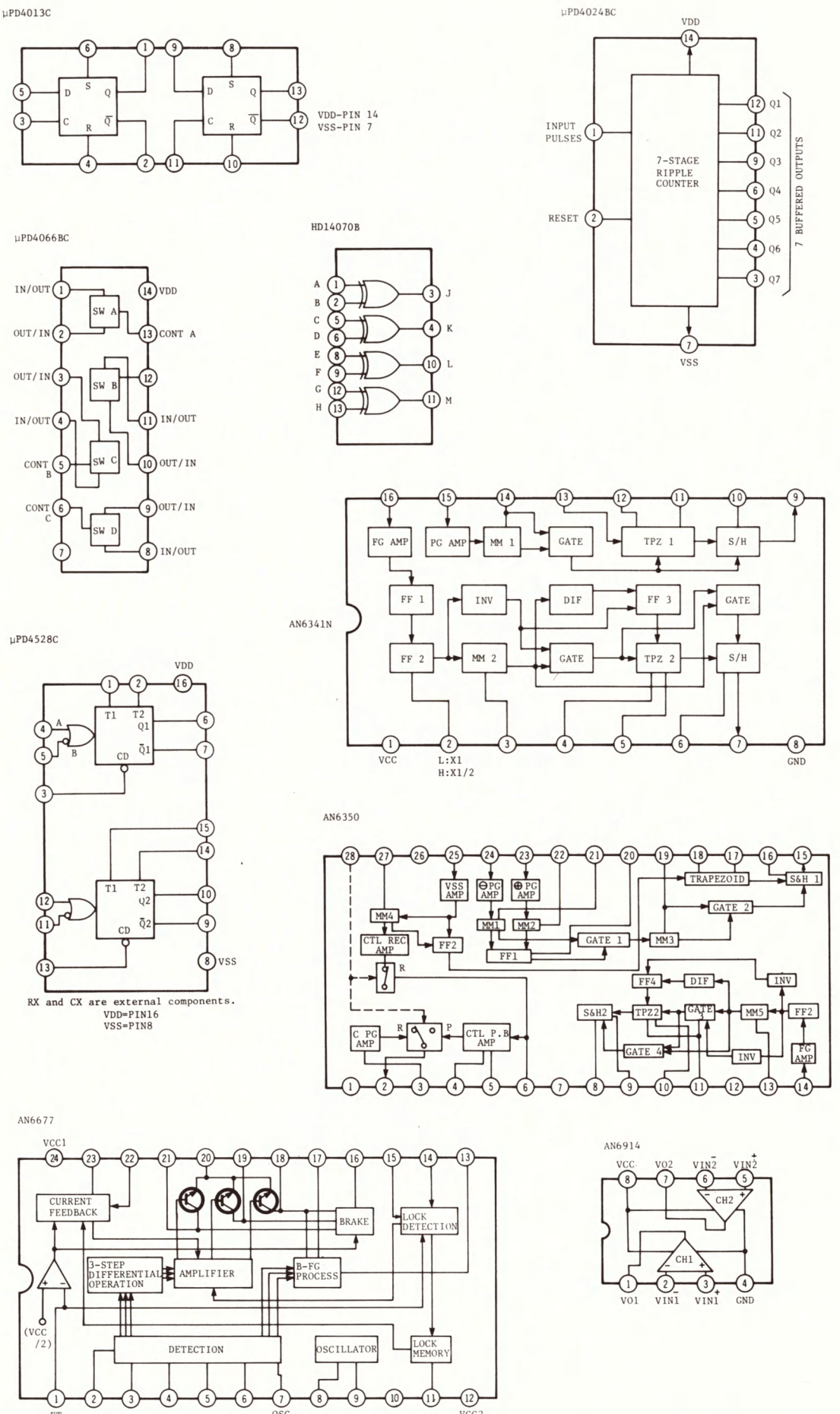
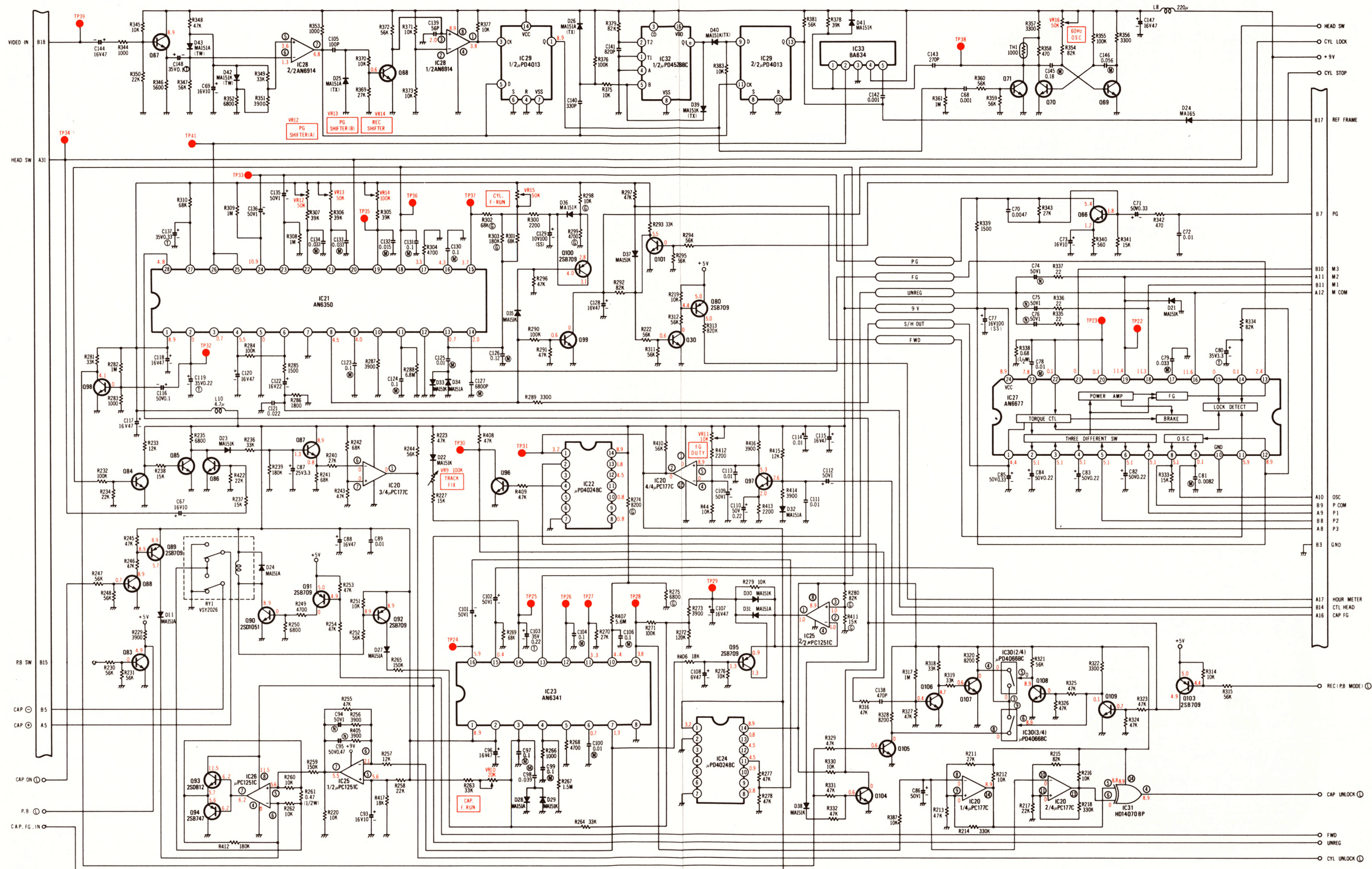
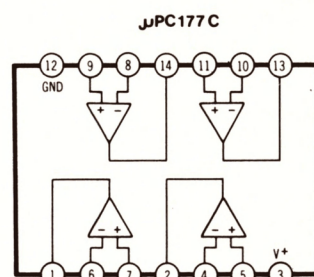
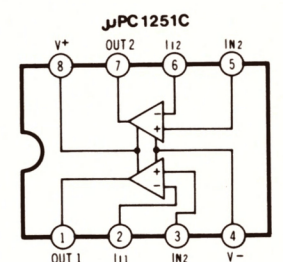
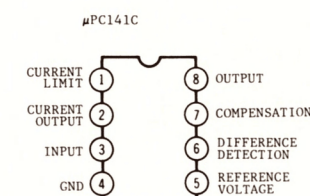
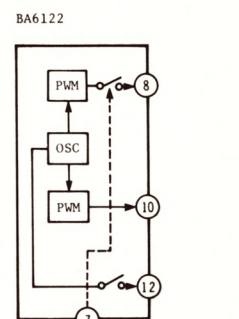
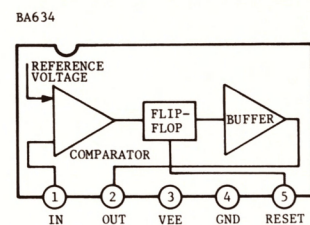


Figure 7-4. Servo/System Control P.C. Board (Servo Section)
7-8

SERVO SCHEMATIC DIAGRAM



NOTE: UNLESS OTHERWISE SPECIFIED, ALL DIODES ARE MA165
UNLESS OTHERWISE SPECIFIED, ALL Tr's ARE 2SD601 (NPN TYPE)

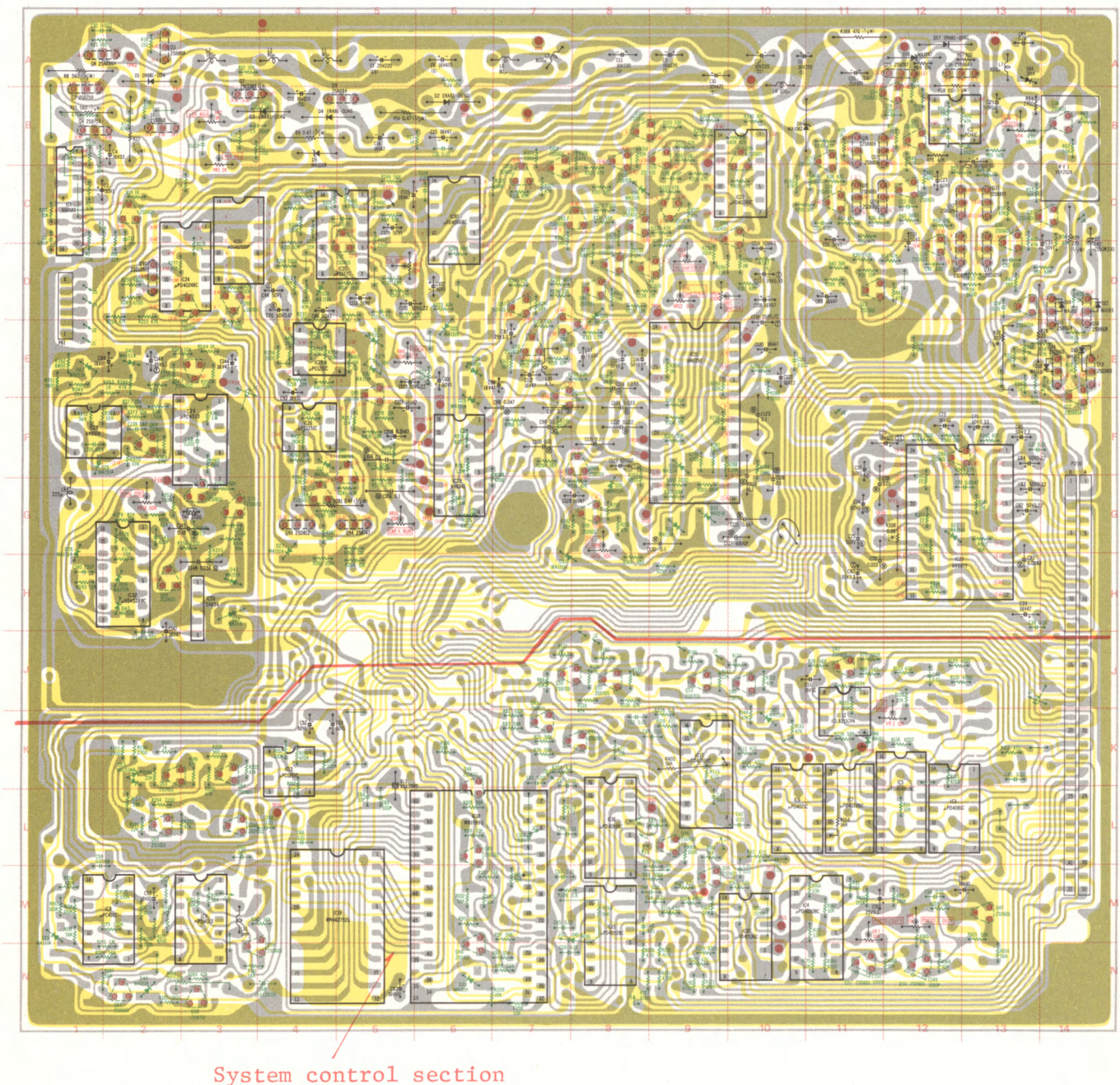
**Figure 7-5. Servo Schematic Diagram
(Part of Servo/System Control Circuit)**

System Control Circuit (part of P2 Board)

- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

System Control Section (VEP02138A)

(part of P-2 Board)



SYSTEM CONTROL BLOCK DIAGRAM

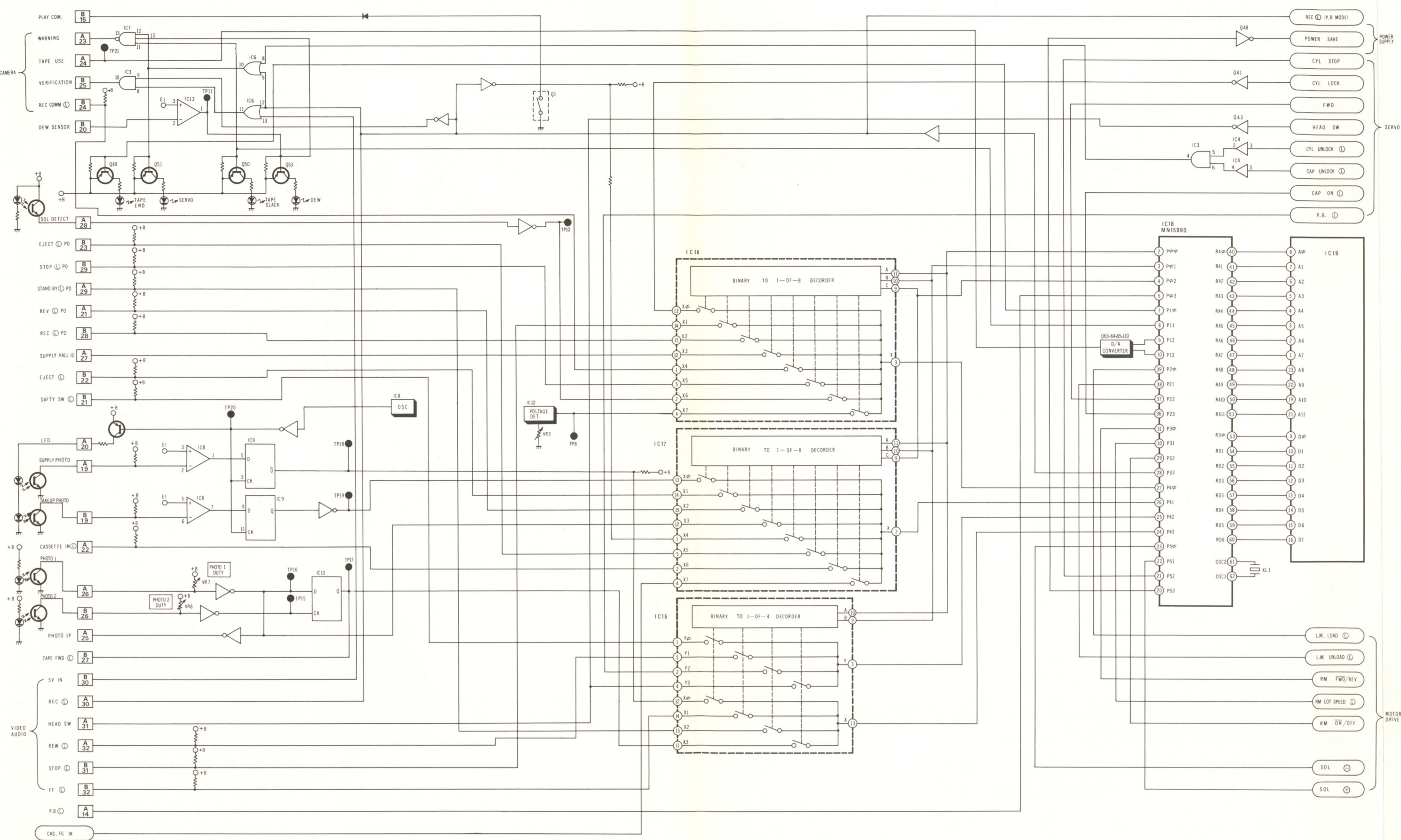


Figure 7-6. System Control Block Diagram

MOTOR & SOLENOID DRIVE BLOCK DIAGRAM

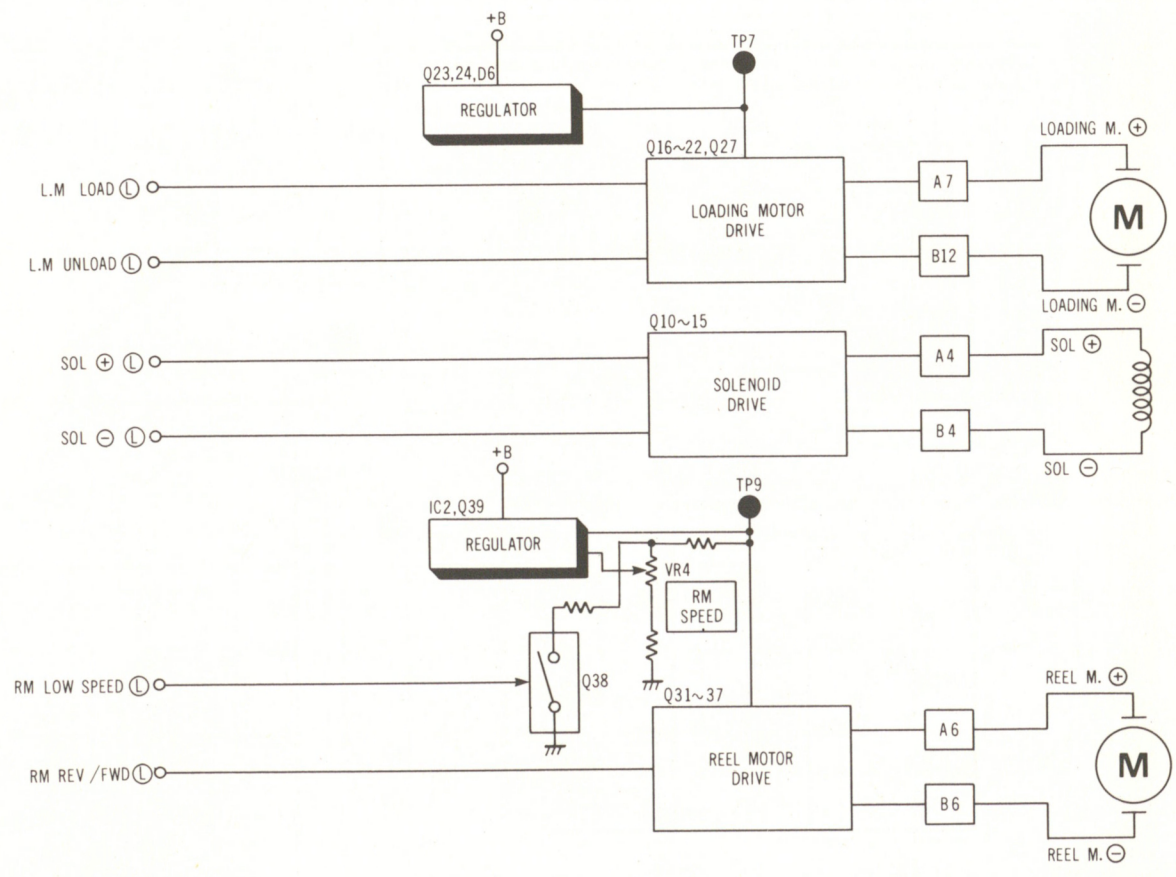
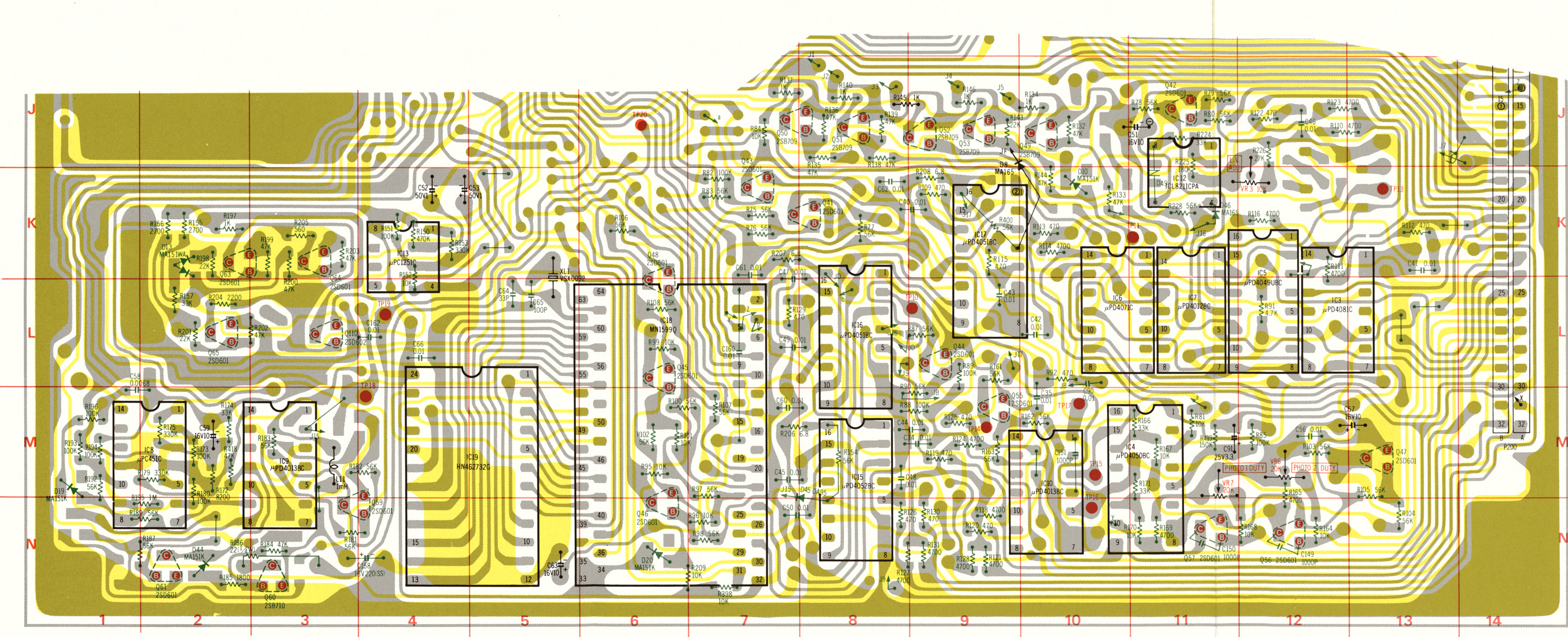


Figure 7-7. Motor & Solenoid Drive Block Diagram

SYSTEM CONTROL P.C. BOARD (VEP02138A) [SYSTEM CONTROL SECTION]

THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE CIRCLE ○
ON THIS DIAGRAM IS RECORD MODE WITH NTSC COLOR BAR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKET ()
ON THIS DIAGRAM IS PLAYBACK MODE WITH NTSC COLOR BAR SIGNAL.



Servo & System Control C.B.A.	
System Control Section	
Q41	K-8
Q42	J-11
Q43	K-7
Q44	L-9
Q45	L-6
Q46	N-6
Q47	M-13
Q48	K-6
Q49	J-10
Q50	J-7
Q51	J-8
Q52	J-9
Q53	J-9
Q55	M-9
Q56	N-12
Q57	N-11
Q58	M-4
Q59	N-4
Q60	N-3
Q61	N-2
Q63	K-2
Q64	K-3
Q65	L-2
Q110	L-3
IC3	L-12
IC4	M-11
IC5	K-12
IC6	L-10
IC7	L-11
IC8	M-2
IC9	M-3
IC10	M-10
IC11	K-12
IC12	K-11
IC13	K-4
IC15	M-8
IC16	L-8
IC17	K-9
IC18	L-6
IC19	M-5

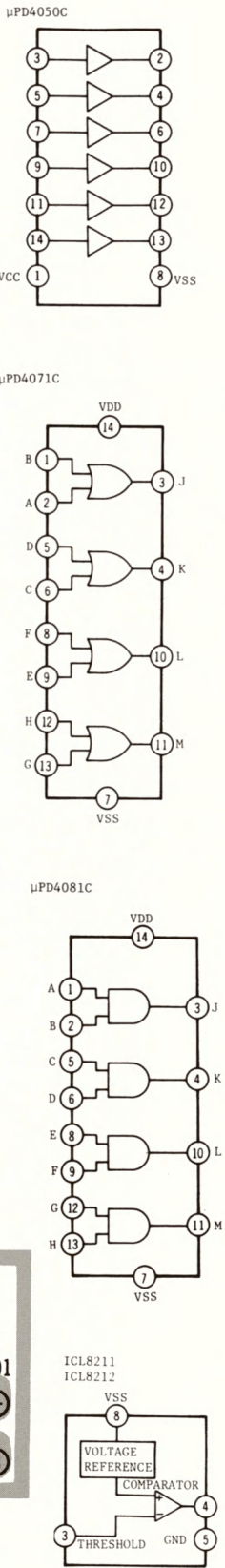
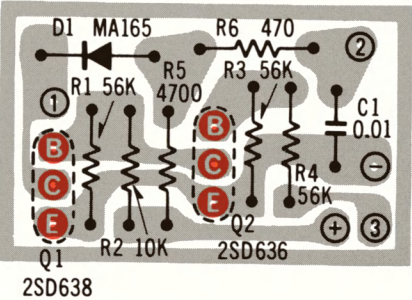
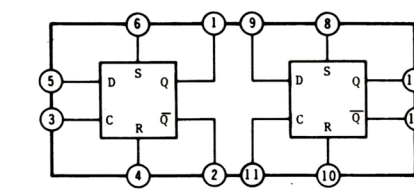
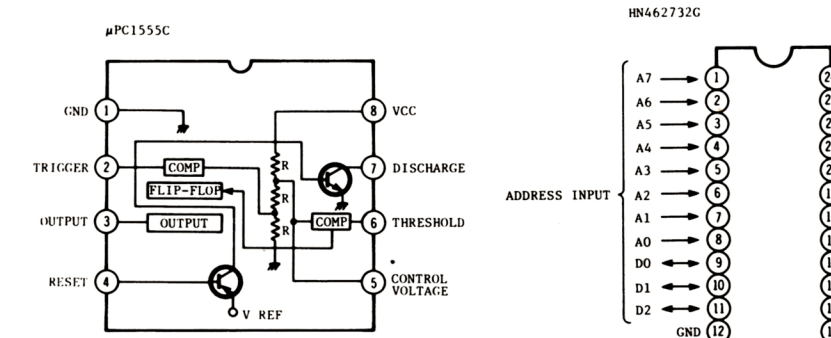
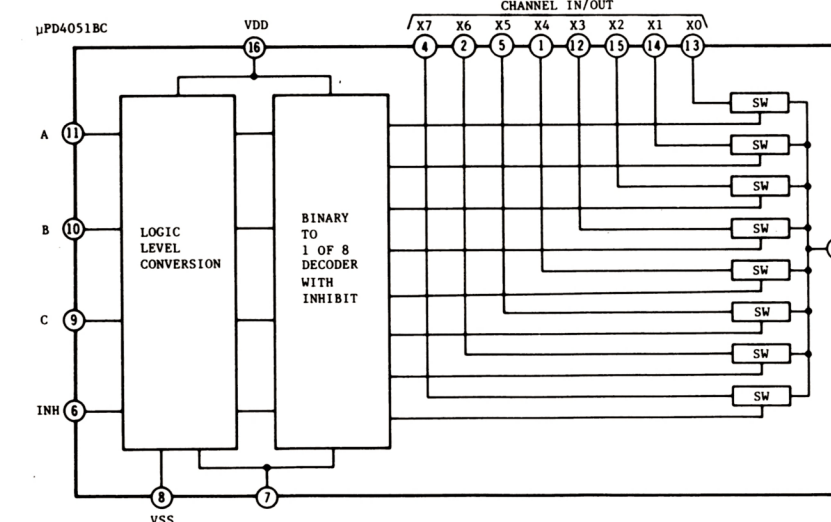
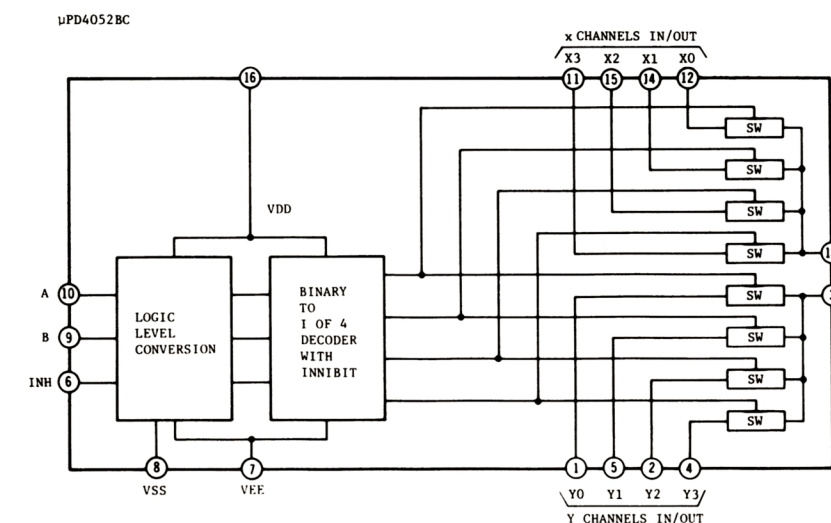
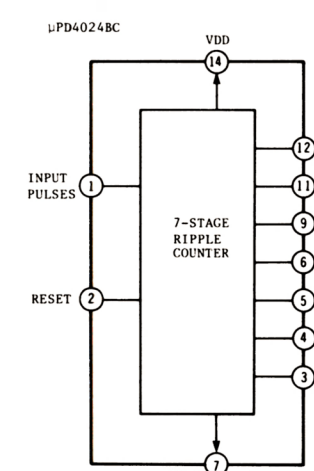
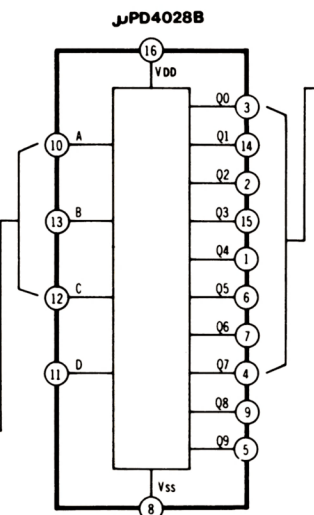
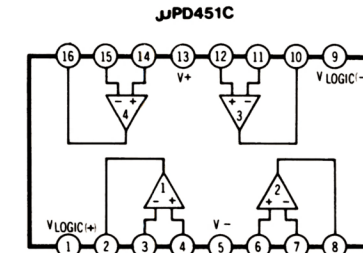
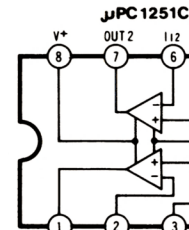
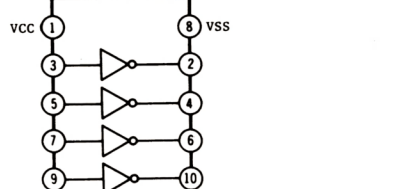


Figure 7-8. Servo/System Control P.C. Board (System Control Section)

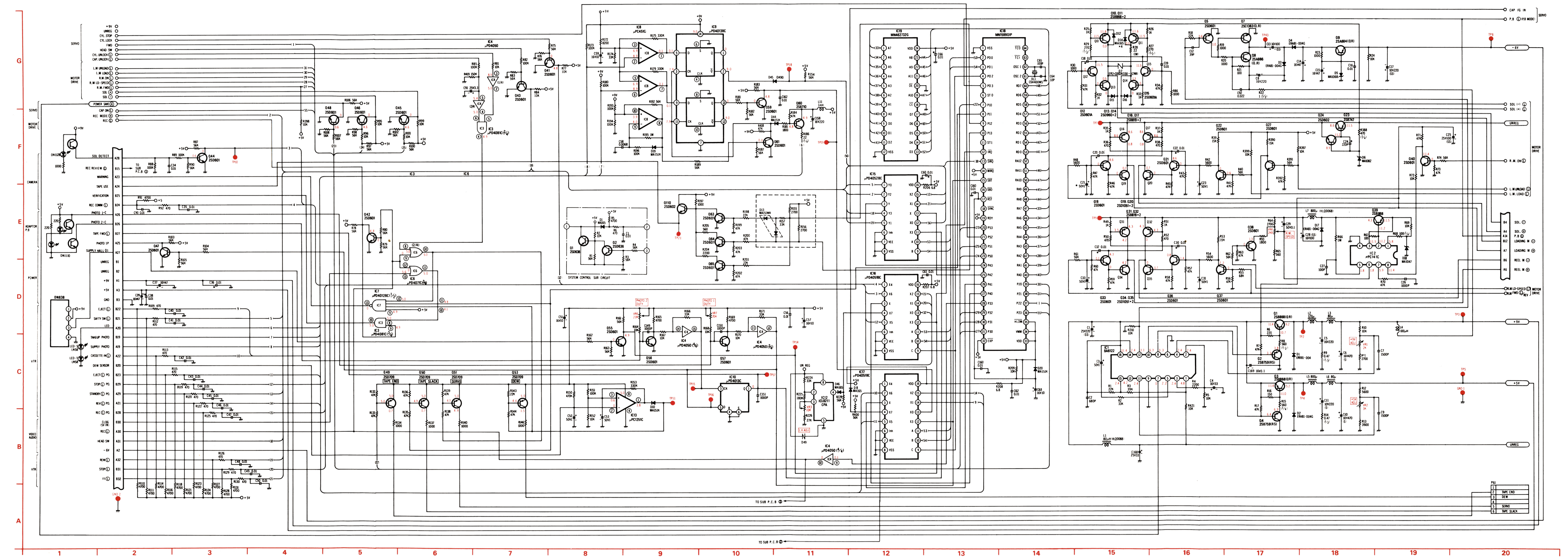
LPD4013C



LPD4049C



SYSTEM CONTROL SCHEMATIC DIAGRAM



THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS () ON THIS DIAGRAM IS PLAYBACK MODE WITH NTSC COLOR BAR SIGNAL. THE MEASUREMENT MODE OF THE DC VOLTAGE OUT OF THE BRACKETS ON THIS DIAGRAM IS RECORD MODE WITH NTSC COLOR BAR SIGNAL.

Figure 7-9. System Control Schematic Diagram (Part of Servo/System Control Circuit)

Service Manual

RECAM™

Portable VTR

AU-100A

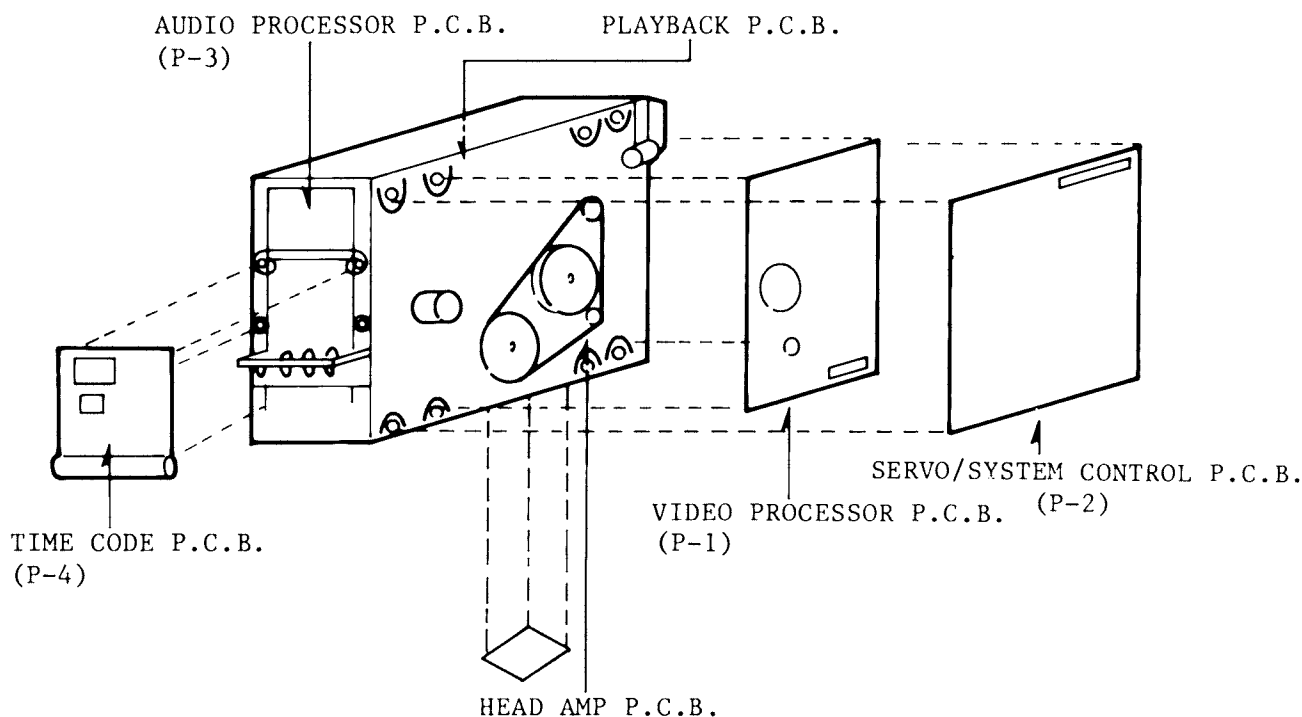


M-VISION™

Audio Processor Circuit (P3)

- *Electrical Parts List*
- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

Audio Processor C.B.A. (VEP0476A)


Panasonic®

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Division of Matsushita Electric
Corporation of America
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New Jersey 07094

Panasonic Hawaii Inc.
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P.O. Box 774
Honolulu, Hawaii 96808-0774

Matsushita Electric
of Canada Limited
5770 Ambler Drive, Mississauga,
Ontario, L4W 2T3

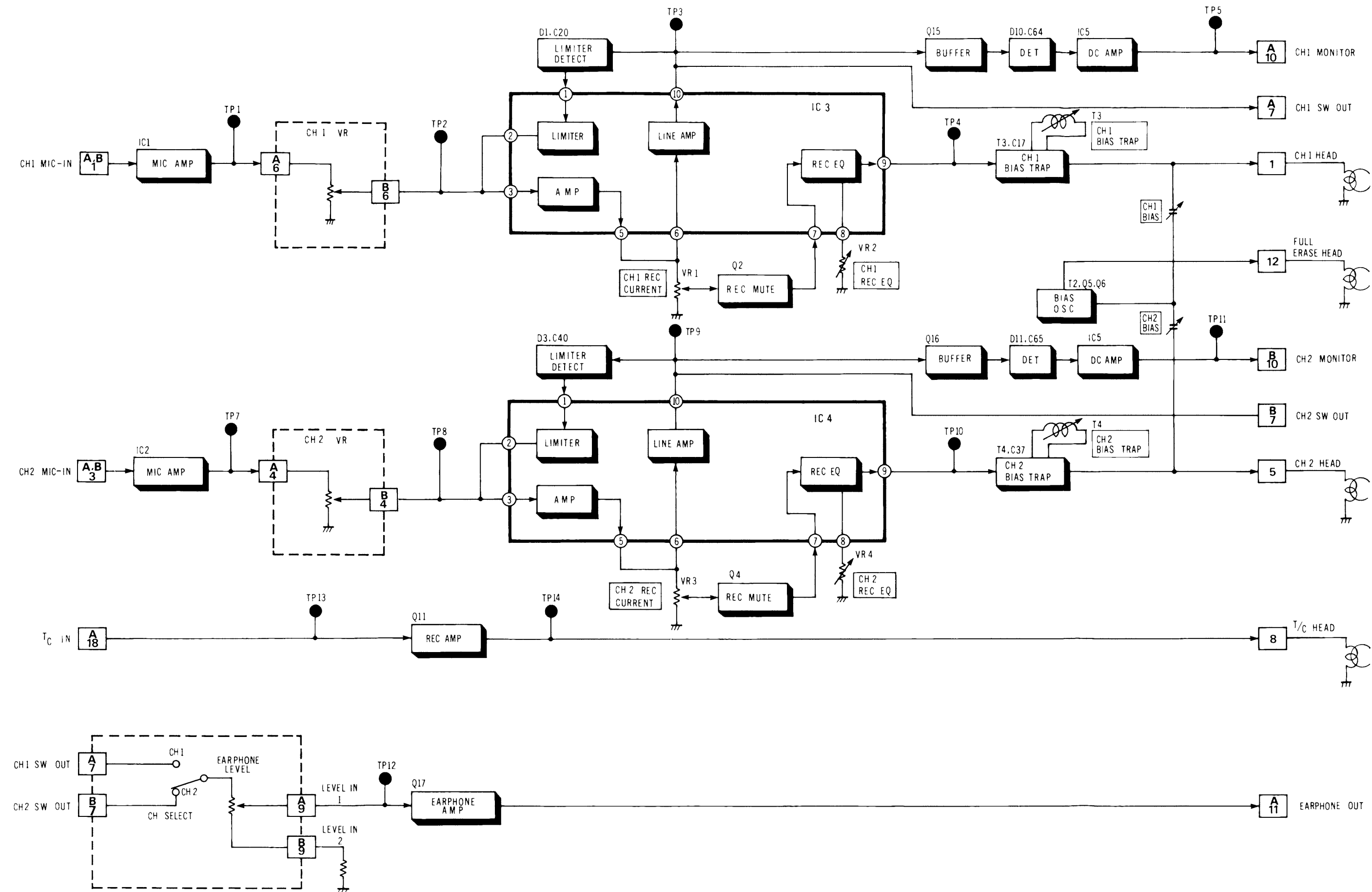
Panasonic Sales Company,
Division of Matsushita Electric
of Puerto Rico, Inc.
Ave. 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP0476A	AUDIO PROCESSOR P.C.			R49	ERJ8GCJ332	3.3K	1	
		BOARD			R50	ERJ8GCJ123	12K	1	
					R51	ERJ8GCJ562	5.6K	1	
		Integrated Circuits			R52	ERJ8GCJ153	15K	1	
IC1,2	NJM2043DD		2		R53	ERJ8GCJ103	10K	1	
IC3,4	AN262		2		R54	ERJ8GCJ152	1.5K	1	
IC5	uPC4558C		1		R55	ERJ8GCJ103	10K	1	
		Transistors			R56	ERJ8GCJ153	15K	1	
Q1-4	2SD601	Chip	4		R57	ERJ8GCJ152	1.5K	1	
Q5,6	2SD602	Chip	2		R58	ERJ8GCJ103	10K	1	
Q7-9	2SD601	Chip	3		R59	ERJ8GCJ153	15K	1	
Q10	2SB710	Chip	1		R60	ERJ8GCJ152	1.5K	1	
Q11-17	2SD601	Chip	7		R61	ERJ8GCJ103	10K	1	
Q18	2SB710	Chip	1		R62	ERJ8GCJ153	15K	1	
		Diodes			R63	ERJ8GCJ101	100	1	
D1-3	MA151K	Chip	3		R64	ERJ8GCJ103	10K	1	
D4	MA151A	Chip	1		R65	ERJ8GCJ473	47K	1	
D5-7	MA151K	Chip	3		R66	ERJ8GCJ102	1K	1	
D8,9	MA151A	Chip	2		R67	ERJ8GCJ682	6.8K	1	
D10	MA151K	Chip	1		R68	ERJ8GCJ680	68	1	
D11	MA151A	Chip	1		R69	ERJ8GCJ272	2.7K	1	
		Resistors			R70	ERJ8GCJ223	22K	1	
R1,2	ERJ8GCJ122	1.2K	2		R71,72	ERJ8GCJ562	5.6K	2	
R3	ERJ8GCJ104	100K	1		R73	ERD25TJ4R7	1/4W 4.7	1	
R4	ERJ8GCJ183	18K	1		R74	ERJ8GCJ223	22K	1	
R5	ERJ8GCJ104	100K	1		R75	ERD10TJ103	10K	1	
R6,7	ERJ8GCJ332	3.3K	2		R76	ERJ8GCJ223	22K	1	
R8	ERJ8GCJ104	100K	1		R77	ERJ8GCJ223	22K	1	
R9	ERJ8GCJ561	560	1		R78	ERD10TJ332	3.3K	1	
R10	ERJ8GCJ273	27K	1		R79,80	ERJ8GCJ223	22K	2	
R11	ERJ8GCJ561	560	1		R81,82	ERJ8GCJ104	100K	2	
R12	ERJ8GCJ103	10K	1		R83	ERJ8GCJ152	1.5K	1	
R13	ERJ8GCJ224	220K	1		R84	ERJ8GCJ103	10K	1	
R14	ERJ8GCJ563	56K	1		R85	ERJ8GCJ563	56K	1	
R15	ERJ8GCJ102	1K	1		R86	ERJ8GCJ153	15K	1	
R16	ERJ8GCJ182	1.8K	1		R87,88	ERJ8GCJ104	100K	2	
R17	ERJ8GCJ223	22K	1		R89	ERJ8GCJ152	1.5K	1	
R18	ERJ8GCJ103	10K	1		R90	ERJ8GCJ103	10K	1	
R19	ERJ8GCJ223	22K	1		R91	ERJ8GCJ563	56K	1	
R20	ERJ8GCJ332	3.3K	1		R92	ERJ8GCJ153	15K	1	
R21	ERJ8GCJ682	6.8K	1		R93	ERJ8GCJ473	47K	1	
R22	ERJ8GCJ332	3.3K	1		R94	ERJ8GCJ124	120K	1	
R23	ERJ8GCJ123	12K	1		R95	ERJ8GCJ331	330	1	
R24	ERJ8GCJ562	5.6K	1		R96	ERJ8GCJ332	3.3K	1	
R25	ERJ8GCJ153	15K	1		R97	ERJ8GCJ223	22K	1	
R26	ERJ8GCJ103	10K	1		R98	ERD10TJ102	1K	1	
R27	ERJ8GCJ152	1.5K	1				Variable Resistors		
R28,29	ERJ8GCJ122	1.2K	2		VR1	EVM38GA00B14	10K	1	
R30-32	ERJ8GCJ104	100K	3		VR2	EVM38GA00B32	300	1	
R33,34	ERJ8GCJ332	3.3K	2		VR3	EVM38GA00B14	10K	1	
R35	ERJ8GCJ104	100K	1		VR4	EVM38GA00B32	300	1	
R36	ERJ8GCJ561	560	1		VR5,6	EVM38GA00B34	30K	2	
R37	ERJ8GCJ273	27K	1				Capacitors		
R38	ERJ8GCJ561	560	1		C1,2	ECUX1H103KRM	Chip 50V 0.01	2	
R39	ERJ8GCJ103	10K	1		C3	ECEA1HN2R2	Tantalum 50V 2.2	1	
R40	ERJ8GCJ224	220K	1		C4	ECUX1H332MDM	Chip Mylar 50V 0.0033	1	
R41	ERJ8GCJ563	56K	1		C5	ECUX1E104MDM	Chip Mylar 25V 0.1	1	
R42	ERJ8GCJ102	1K	1		C6	ECSF35E2R2	Tantalum 35V 2.2	1	
R43	ERJ8GCJ182	1.8K	1		C7	ECUX1H103MDM	Chip Mylar 50V 0.01	1	
R44	ERJ8GCJ822	8.2K	1		C8	ECEA1HNR68	Tantalum 50V 0.68	1	
R45	ERJ8GCJ103	10K	1		C9	ECUX1H391KM	Chip 50V 390P	1	
R46	ERJ8GCJ223	22K	1		C10	ECSF35E1	Tantalum 35V 1	1	
R47	ERJ8GCJ332	3.3K	1		C11	ECSF35E2R2	Tantalum 35V 2.2	1	
R48	ERJ8GCJ682	6.8K	1		C12	ECUX1H472MDM	Chip Mylar 50V 0.0047	1	
					C13	ECSF35E2R2	Tantalum 35V 2.2	1	
					C14	ECUX1E104MDM	Chip Mylar 25V 0.1	1	

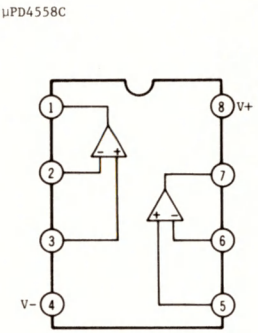
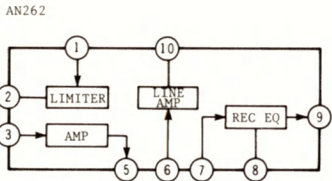
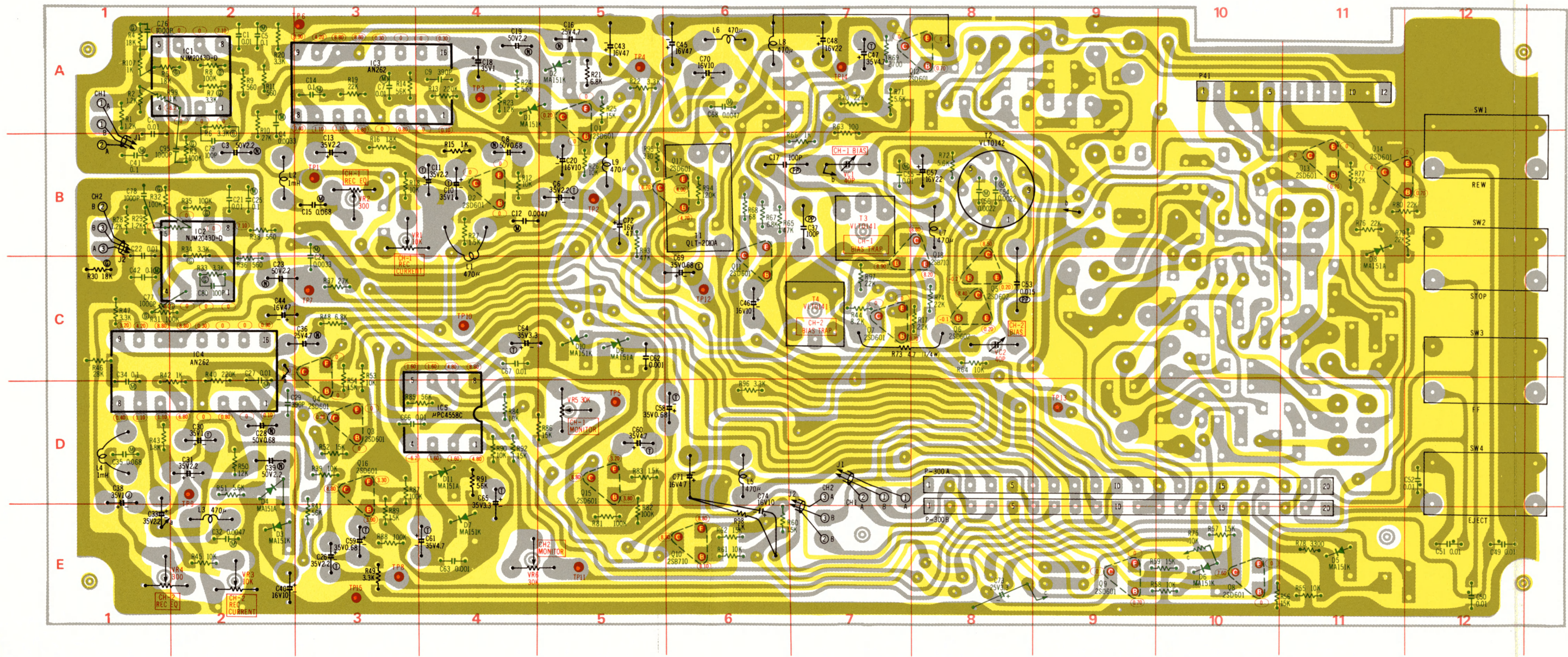
REV 1

AUDIO PROCESSOR BLOCK DIAGRAM.



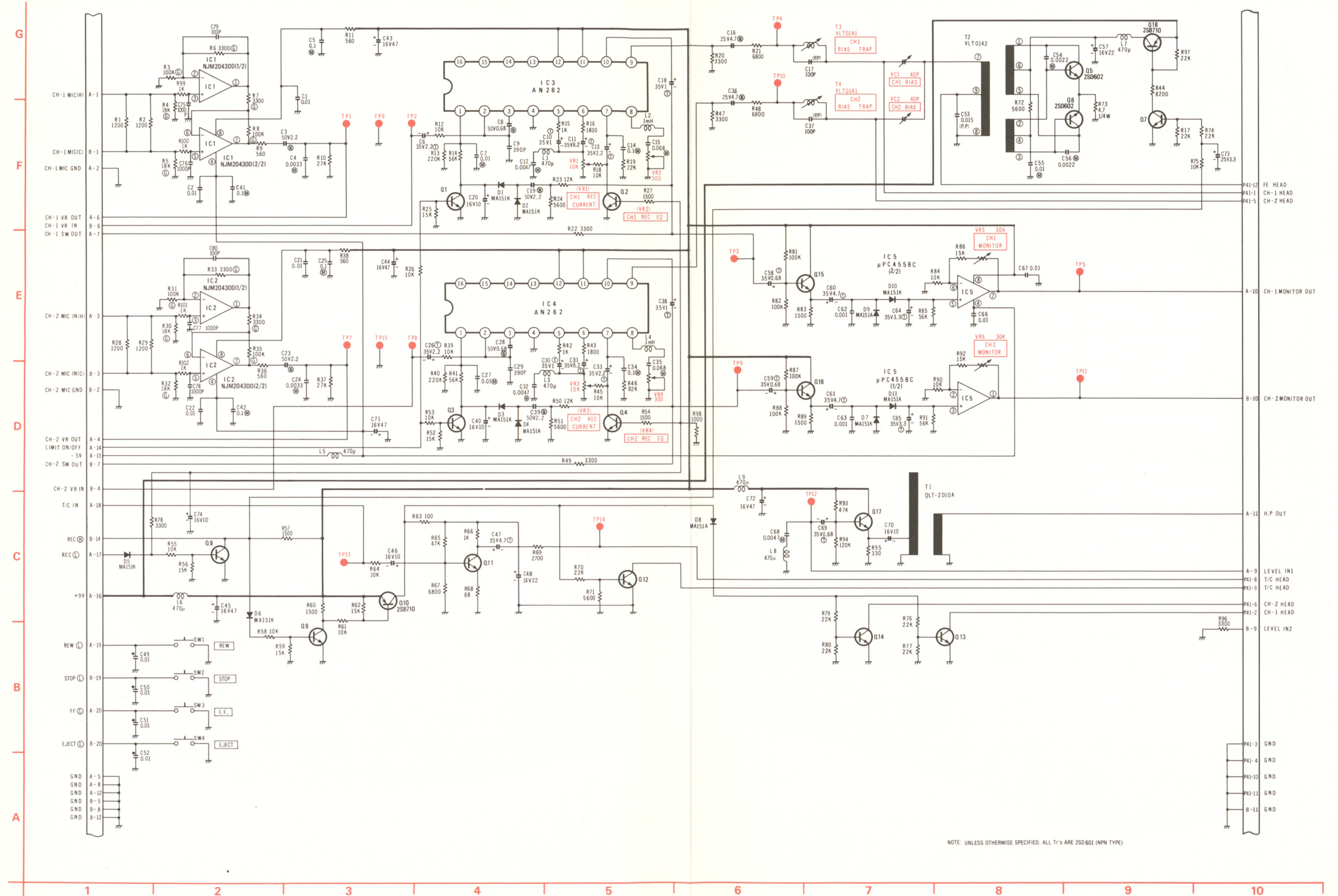
AUDIO PROCESSOR P.C. BOARD (VEP0476A)

THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE CIRCLE ○
ON THIS DIAGRAM IS RECORD MODE WITH NTSC COLOR BAR SIGNAL.
THE MEASUREMENT MODE OF THE DC VOLTAGE IN THE BRACKETS ()
ON THIS DIAGRAM IS PLAYBACK MODE WITH NTSC COLOR BAR SIGNAL.



Audio C.B.A.	
Q1	A-5
Q2	B-2
Q3	D-3
Q4	C-3
Q5	C-8
Q6	C-8
Q7	C-7
Q8	E-10
Q9	E-9
Q10	E-6
Q11	B-6
Q12	A-8
Q13	B-11
Q14	B-11
Q15	D-5
Q16	D-3
Q17	B-6
Q18	B-8
IC1	A-2
IC2	B-2
IC3	A-3
IC4	C-2
IC5	D-4

AUDIO PROCESSOR SCHEMATIC DIAGRAM



NOTE: UNLESS OTHERWISE SPECIFIED, ALL TRs ARE 2SD601 (NPN TYPE)

Figure 8-3. Audio Processor Schematic Diagram

Service Manual

RECAM™

Time Code Circuit (P4)

- *Electrical Parts List*
- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

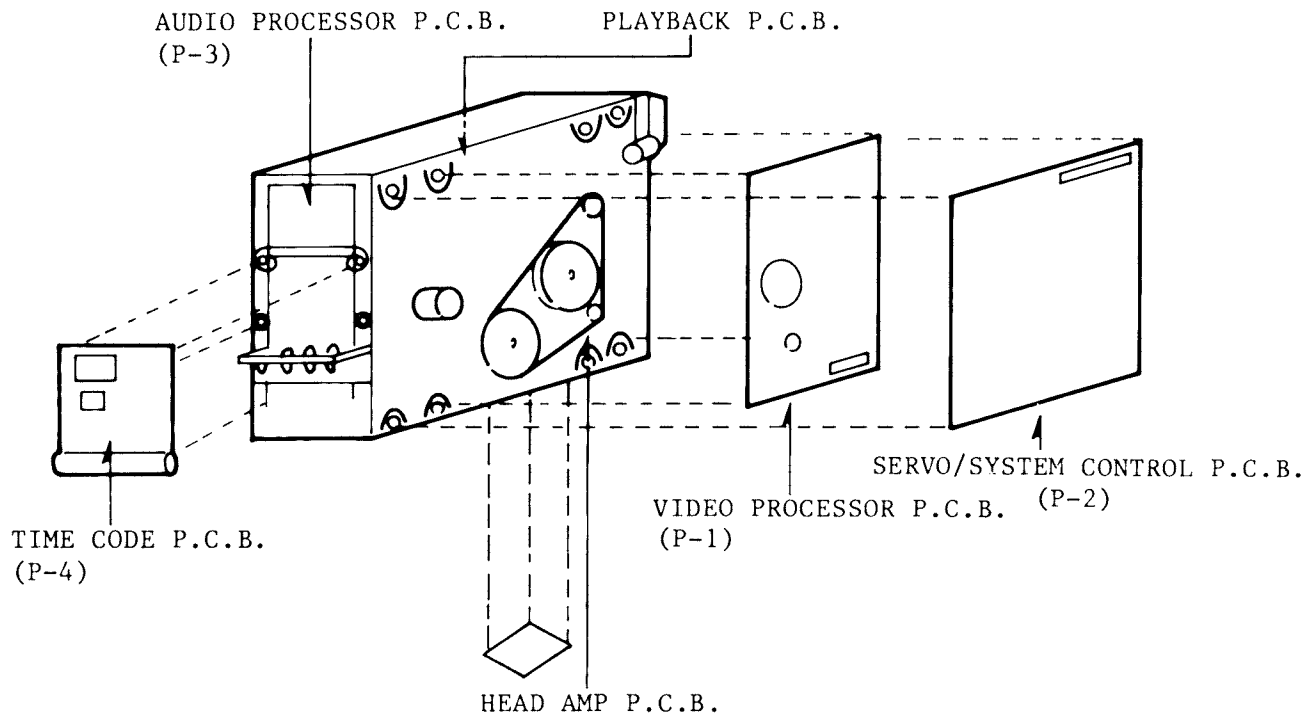
Portable VTR

AU-100A



M-VISION™

Time Code C.B.A. (VEP00A18B)



Panasonic®

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of Puerto Rico, Inc.
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Victoria Industrial Park
Carolina, Puerto Rico 00630

Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP00A18B	TIME CODE GENERATOR					Variable Resistor		
					VR1	EVMG0GA01B25	200K	1	
		Integrated Circuits							
IC1	HD14538BP		1						
IC2	HD14081BP		1						
IC3	μPD4011BC		1						
IC4	μPD4027BC		1				Capacitors		
IC5	MB84060BM-G		1		C1	ECKF1H681KB	Ceramic 50V 680P	1	
IC6	μPD7502G076		1		C2,3	ECKF1H102KB	Ceramic 50V 1000P	2	
IC7	HD14538BP		1		C4	ECEA1HKR47	Electrolytic 50V 0.47	1	
					C5	ECEA1CK100	Electrolytic 16V 10	1	
					C6	ECEA1EK4R7	Electrolytic 25V 4.7	1	
					C7-10	ECKF1H102KB	Ceramic 50V 1000P	1	
					C11	ECKF1H1032F	Ceramic 50V 0.01	1	
		Diodes			C12	ECCF1H330KC	Ceramic 50V 33P	1	
D1-5	MA165		5		C13	ECEA1HK010	Electrolytic 50V 1	1	
D6	HZ3BLL		1		C14	ECKF1H681KB	Ceramic 50V 680P	1	
D7	MA165		1		C15	ECV1ZW60X65	Trimmer 60P	1	
D8	OA95		1		C16	ECCF1H390KC	Ceramic 50V 10P	1	
D9	RD5.6EB		1		C17-19	ECEA1HK2R2	Electrolytic 50V 2.2	3	
D10-12	MA165		3						
							Miscellaneous		
		Transistors			X1	VSX0097	X'tal 76.7232kHz	1	
Q1	2SD636		1		SW1	VSS0081	DIP Switch	1	
					SW2-4	EVQQS404B	Switch	3	
						VMA6285	LCD Mounting Bracket	1	
						VSQ0292	Conductive Rubber	1	
						VMG0263	LCD Suspension Rubber	1	
					CN1	VJP1248T	Angle Pin Header	1	
					CN2	VJP1242T	Angle Pin Header	1	
						VMX0611	LCD Spacer	1	
					TP1-5	VJH0183		5	
					W4-7	ERDS2T0		4	
					LCD	EDD032K04A3	LCD	1	
					B1	P-01-L4P4	Battery	1	
						VJB00A18	P.C. Board	1	
						VMA5877	Battery Holder	1	
		Resistors				XYN3-F6FX	M3x6 Screw	1	
R1-3	ERDS2TJ104	1/4W 100K	3			XNG3B	M3 Nut	1	
R4	ERD25TJ681	1/4W 680	1						
R5	ERDS2TJ104	1/4W 100K	1						
R6,7	ERDS2TJ153	1/4W 15K	2						
R8-11	ERDS2TJ103	1/4W 10K	4						
R12	ERDS2TJ104	1/4W 100K	1						
R13	ERDS2TJ472	1/4W 4.7K	1						
R14	ERDS2TJ332	1/4W 3.3K	1						
R15-17	ERDS2TJ104	1/4W 100K	3						
R18	ERDS2TJ823	1/4W 82K	1						
R19	ERDS2TJ153	1/4W 15K	1						
R20,21	ERDS2TJ104	1/4W 100K	2						
R22	ERDS2TJ103	1/4W 10K	1						
R23	ERDS2TJ104	1/4W 100K	1						
R24,25	ERDS2TJ103	1/4W 10K	2						
R27,28	ERDS2TJ104	1/4W 100K	2						
R30,31	ERDS2TJ104	1/4W 100K	2						
R32	ERDS2TJ103	1/4W 10K	1						
R33	ERC14GJ226	1/4W 22M	1						
R35	ERDS2TJ103	1/4W 10K	1						
R36	ERDS2TJ102	1/4W 1K	1						
R37	ERDS2TJ562	1/4W 5.6K	1						
R38	ERDS2TJ104	1/4W 100K	1						
R39	ERDS2TJ103	1/4W 10K	1						
R40,41	ERDS2TJ104	1/4W 100K	1						

REV 1

TIME CODE GENERATOR BLOCK DIAGRAM

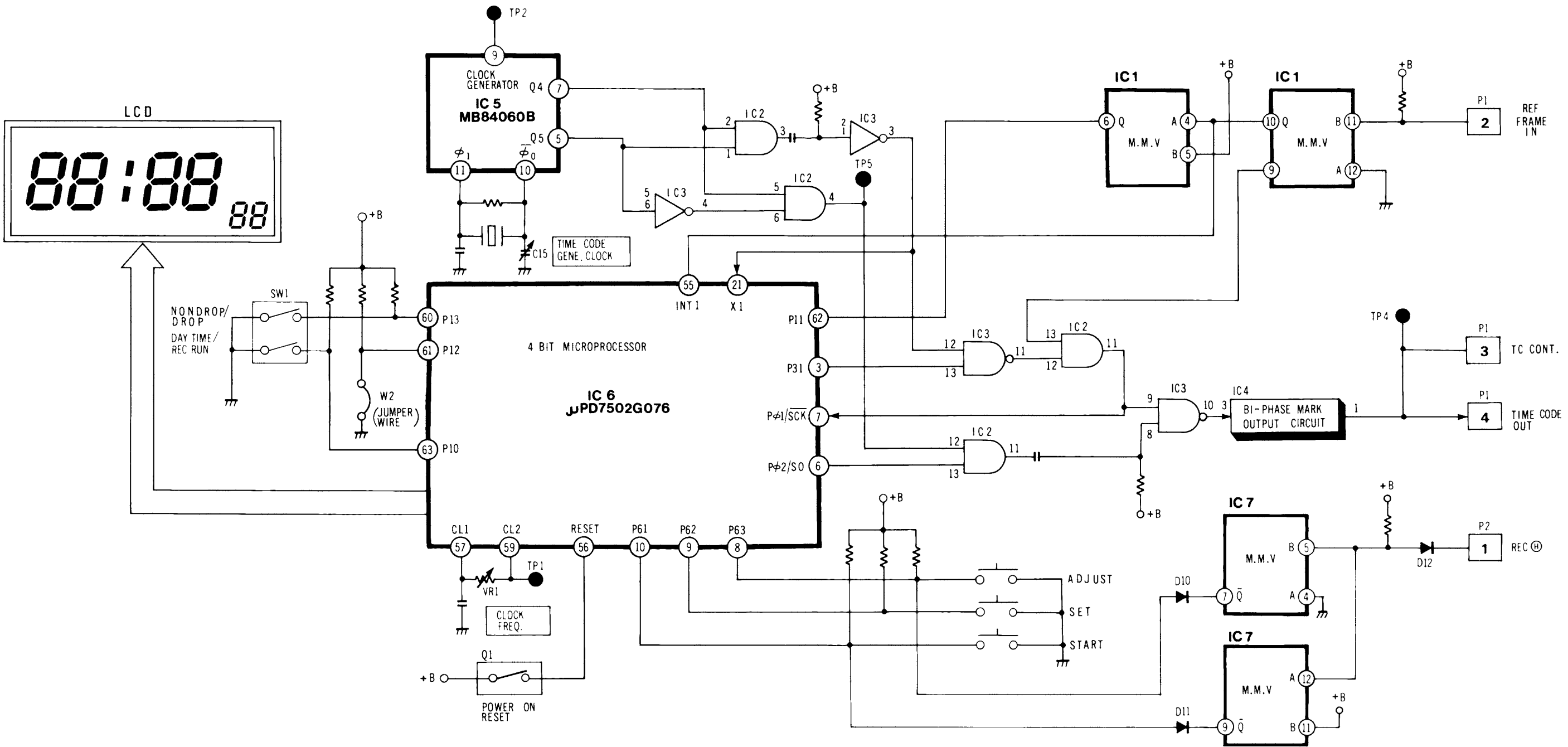
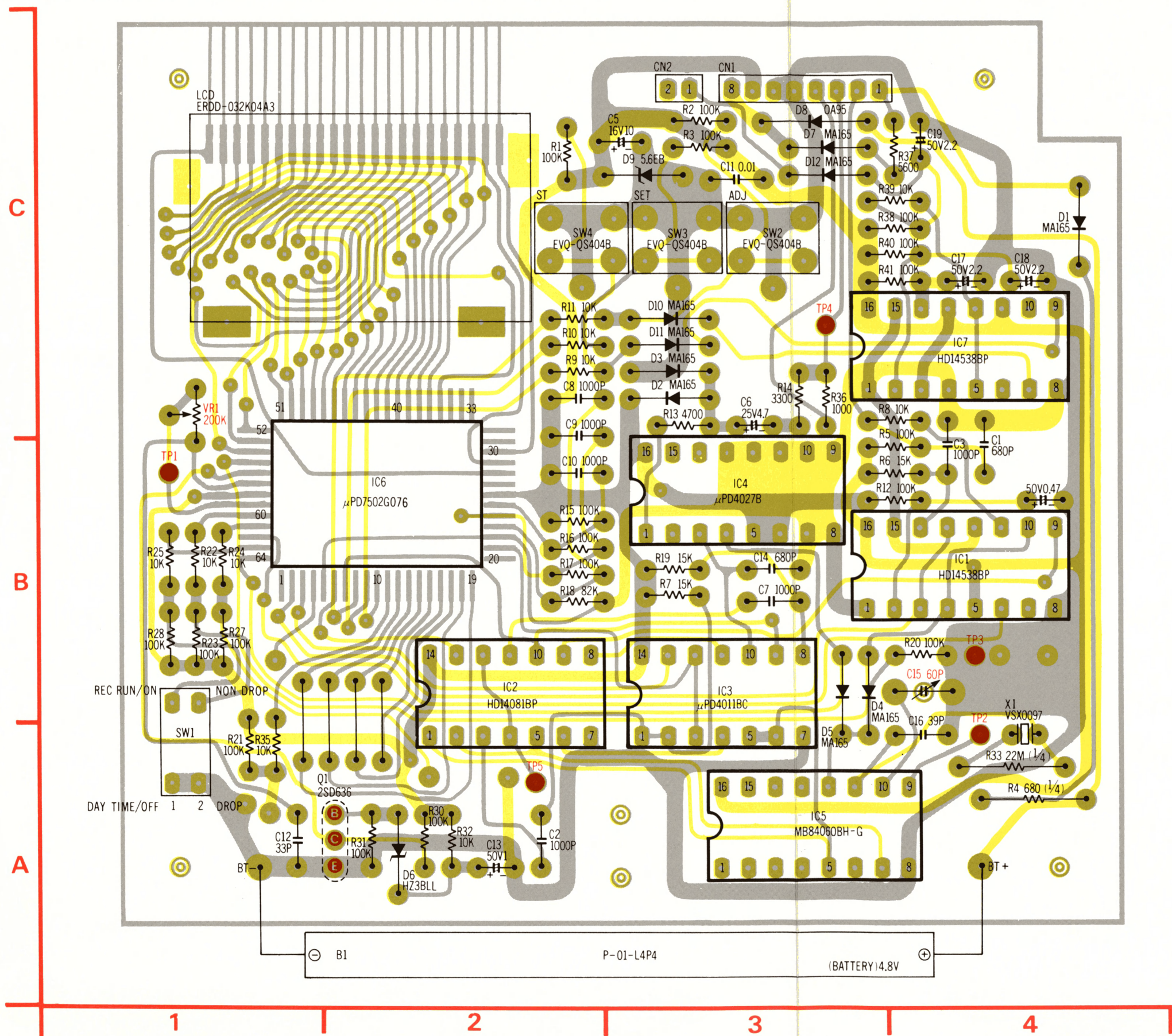


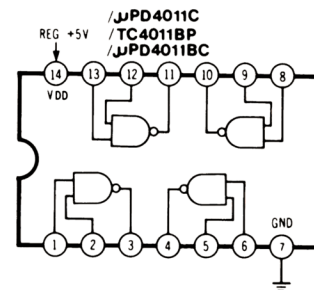
Figure 9-1. Time Code Generator Block Diagram

TIME CODE GENERATOR P.C. BOARD (VEP00A18B)



Time Code Generator C.B.A.	
Q1	A-2
IC1	B-4
IC2	A-2
IC3	A-3
IC4	B-3
IC5	A-3
IC6	B-2
IC7	C-4

Figure 9-2. Time Code Generator
P.C. Board



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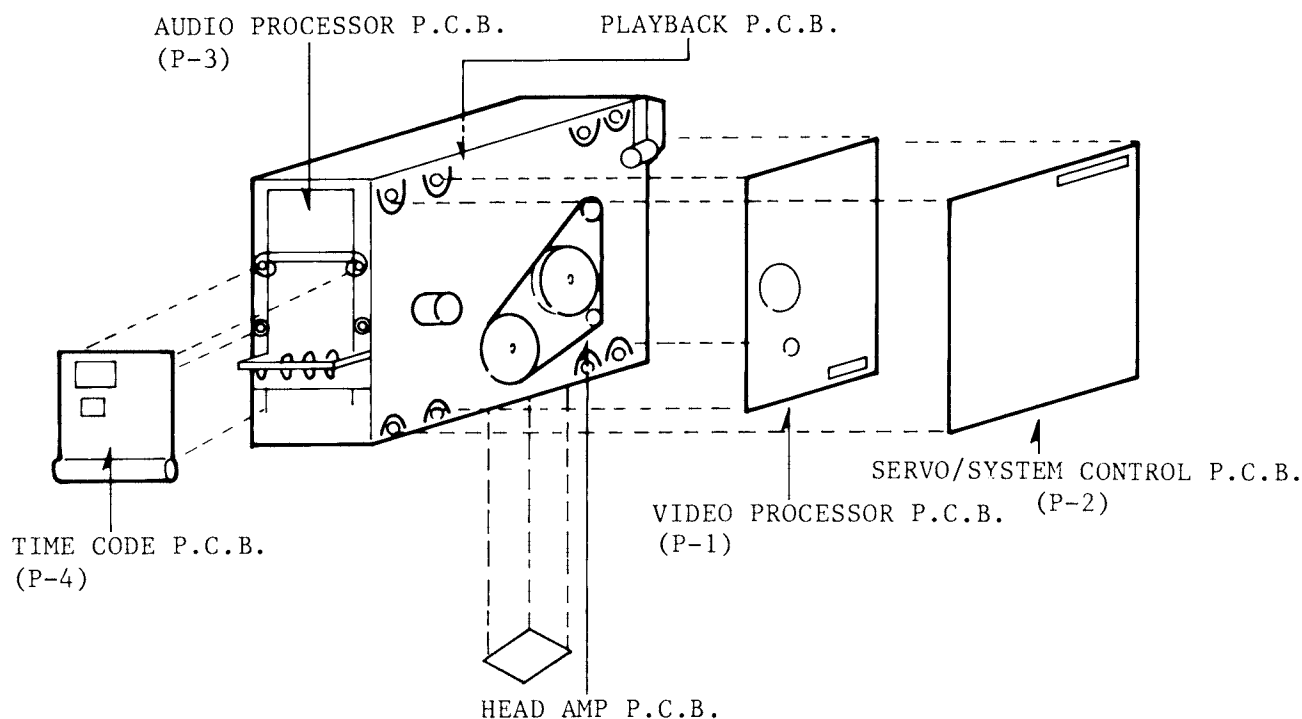


M-VISION™

Head Amp Processor Circuit

- *Electrical Parts List*
- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

Head Amp Processor C.B.A. (VEP05050A)



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Parts List

Ref. No.	Part No.	Part Name & Description	Pos / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pos / Set	Remarks
	VXP5050A	HEAD AMP C.B.A.					Coils		
					L1	VLQEL05F471K	470 μ H	1	
					L2	VLQEL05F220K	22 μ H	1	
		Integrated Circuits			L3	VLQEL05F2R2K	2.2 μ H	1	
IC1	AN6320		1		L4	VLQEL05F100K	10 μ H	1	
					L5	VLQEL05F220K	22 μ H	1	
					L6	VQEL05F2R2K	2.2 μ H	1	
		Transistors							
Q1-3	2SD602		3						
Q4	2SD601		1				Connectors		
					P701	VJP1246T	6P	1	
					P702	VJP1233T	6P	1	
					P703	VJP1229T	7P	1	
		Diodes							
D1	MA151A		1						
							Miscellaneous		
					TP1-8	VJH0183	TP No. 248 Contact	8	
						VSC0896-1	HA Shield (Bottom)	1	
						VSC0895	HA Shield (Top)	1	
						VMZ0481-1	HA Shield	1	
							(Insulation Board)		
		Resistors							
R1,2	ERJ8GCJ100	Chip	10	2					
R3,4	ERJ8GCJ182	Chip	1.8K	2					
R5	ERJ8GCJ121	Chip	120	1					
R6	ERJ8GCJ681	Chip	680	1					
R7	ERJ8GCJ103	Chip	10K	1					
R8	ERJ8GCJ272	Chip	2.7K	1					
R9	ERJ8GCJ273	Chip	27K	1					
R10	ERJ8GCJ222	Chip	2.2K	1					
R11,12	ERJ8GCJ822	Chip	8.2K	2					
R13	ERJ8GCJ222	Chip	2.2K	1					
R14,15	ERJ8GCJ473	Chip	47K	2					
R16	ERJ8GCJ472	Chip	4.7K	1					
R17	ERJ8GCJ101	Chip	100	1					
R18	ERJ8GCJ330	Chip	33	1					
R19,20	ERJ8GCJ473	Chip	47K	2					
		Variable Resistors							
VR1	EVM3AGA00B13		1K	1					
VR2	EVM3AGA00B23		2K	1					
VR3	VVM3AGA00B13		1K	1					
		Capacitors							
C1	ECUX1E104MD	Chip	25V 0.1	1					
C2	ECUX1H102KB	Chip	50V 1000P	1					
C3-5	ECUX1H103KB	Chip	50V 0.01	3					
C6	ECEA1CK470	Electrolytic	16V 47	1					
C7	ECUX1H220JC	Chip	50V 22P	1					
C8,9	ECUX1H103KB	Chip	50V 0.01	2					
C10	ECUX1H150JC	Chip	50V 15P	1					
C11	ECUX1H103KB	Chip	50V 0.01	1					
C12	ECUX1H220JC	Chip	50V 22P	1					
C13	ECUX1H103KB	Chip	50V 0.01	1					
C14,15	ECUX1H470JC	Chip	50V 47P	2					
C16	ECUX1H103KB	Chip	50V 0.01	1					
C17	ECSF1VE105	Tantalum	35V 1	1					
C18	ECEA1CK100	Electrolytic	16V 10	1					
C19	ECUX1H103KB	Chip	50V 0.01	1					
C20	ECSF1VE105	Tantalum	35V 1	1					
VCl,2	ECV1ZW50X64T	Trimmer	50P	2					

REV 1

HEAD AMP BLOCK DIAGRAM

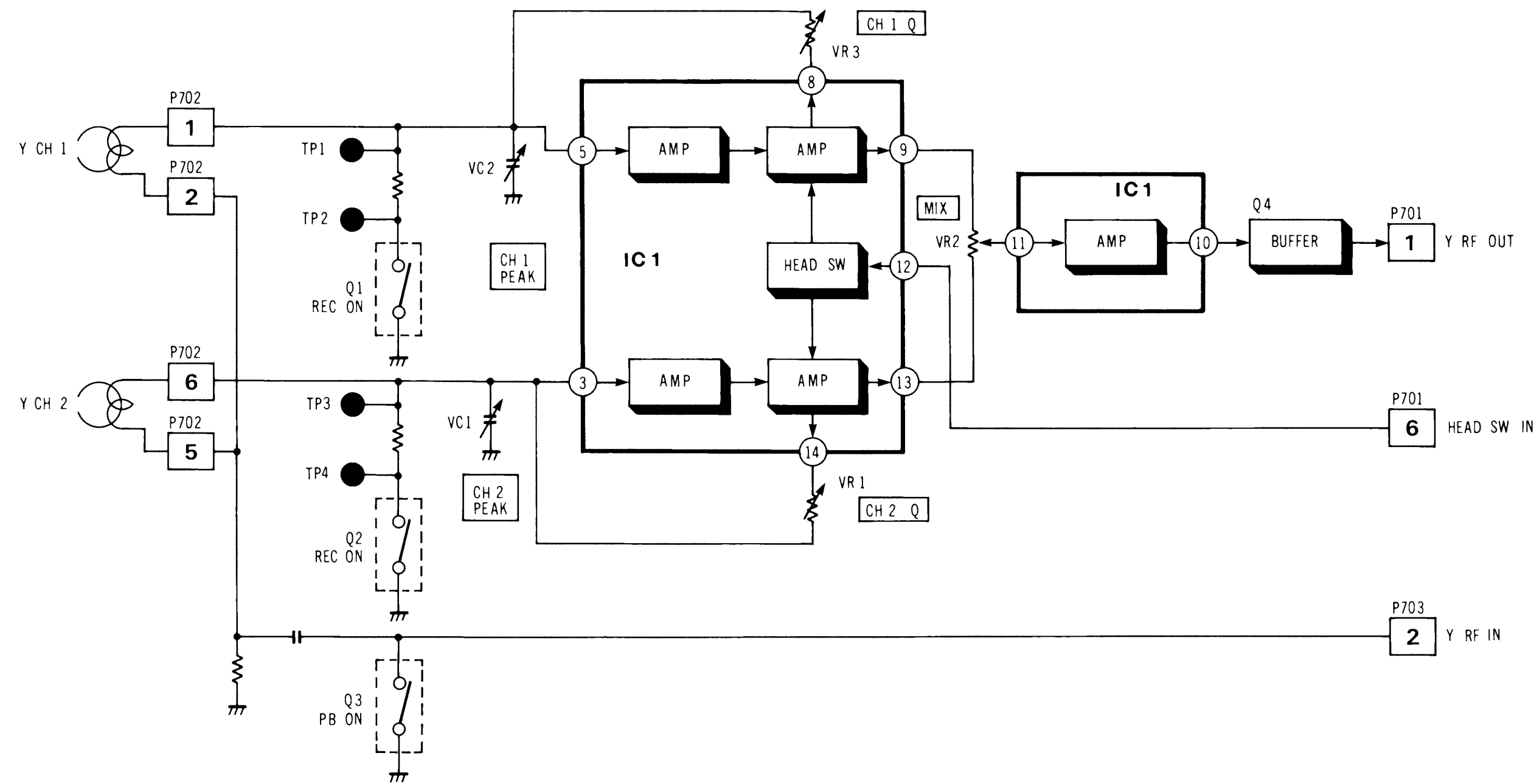


Figure 10-1. Head Amp Block Diagram

HEAD AMP P.C.BOARD (VEP05050A)

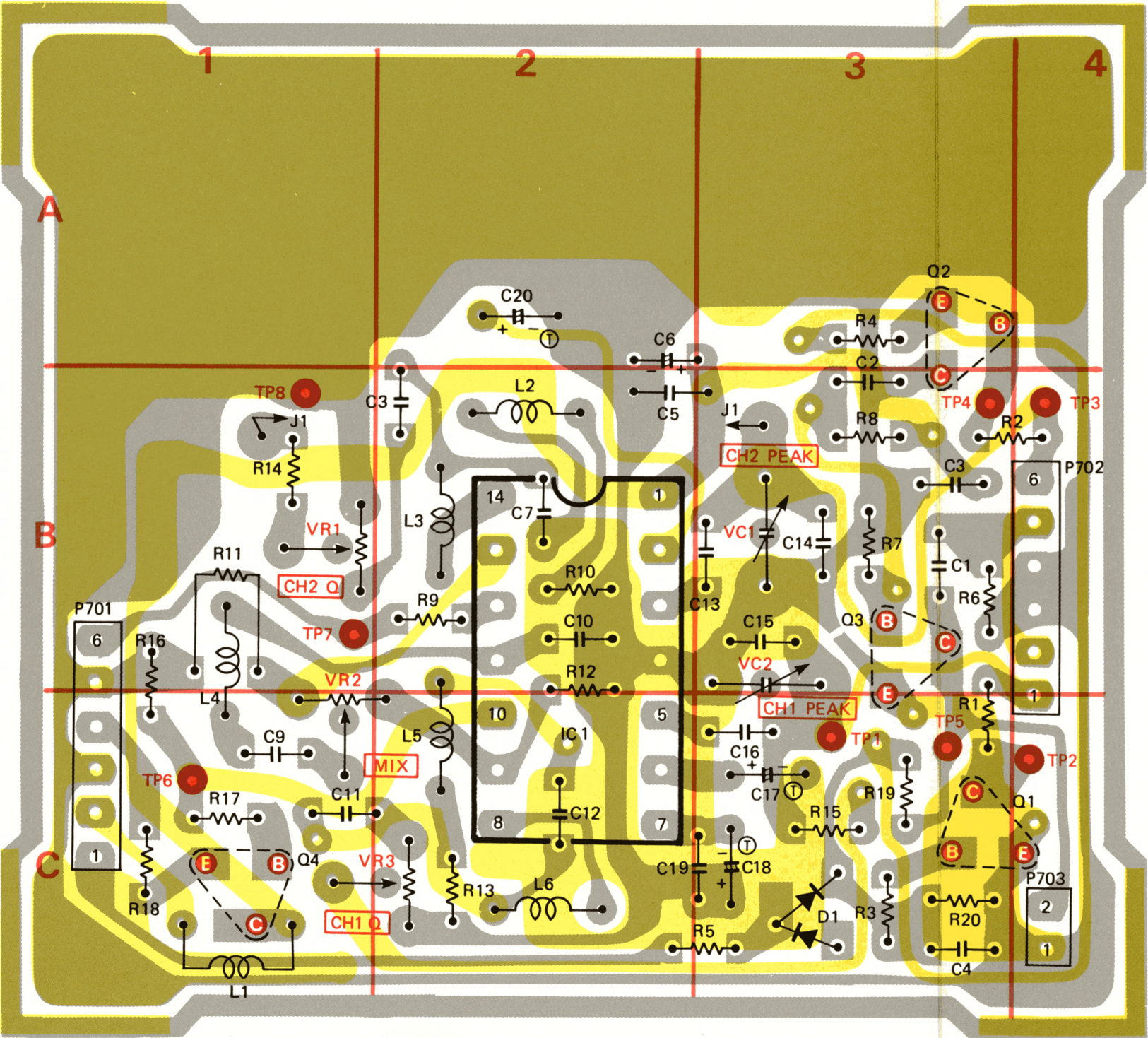


Figure 10-2. Head Amp P.C.Board

HEAD AMP SCHEMATIC DIAGRAM

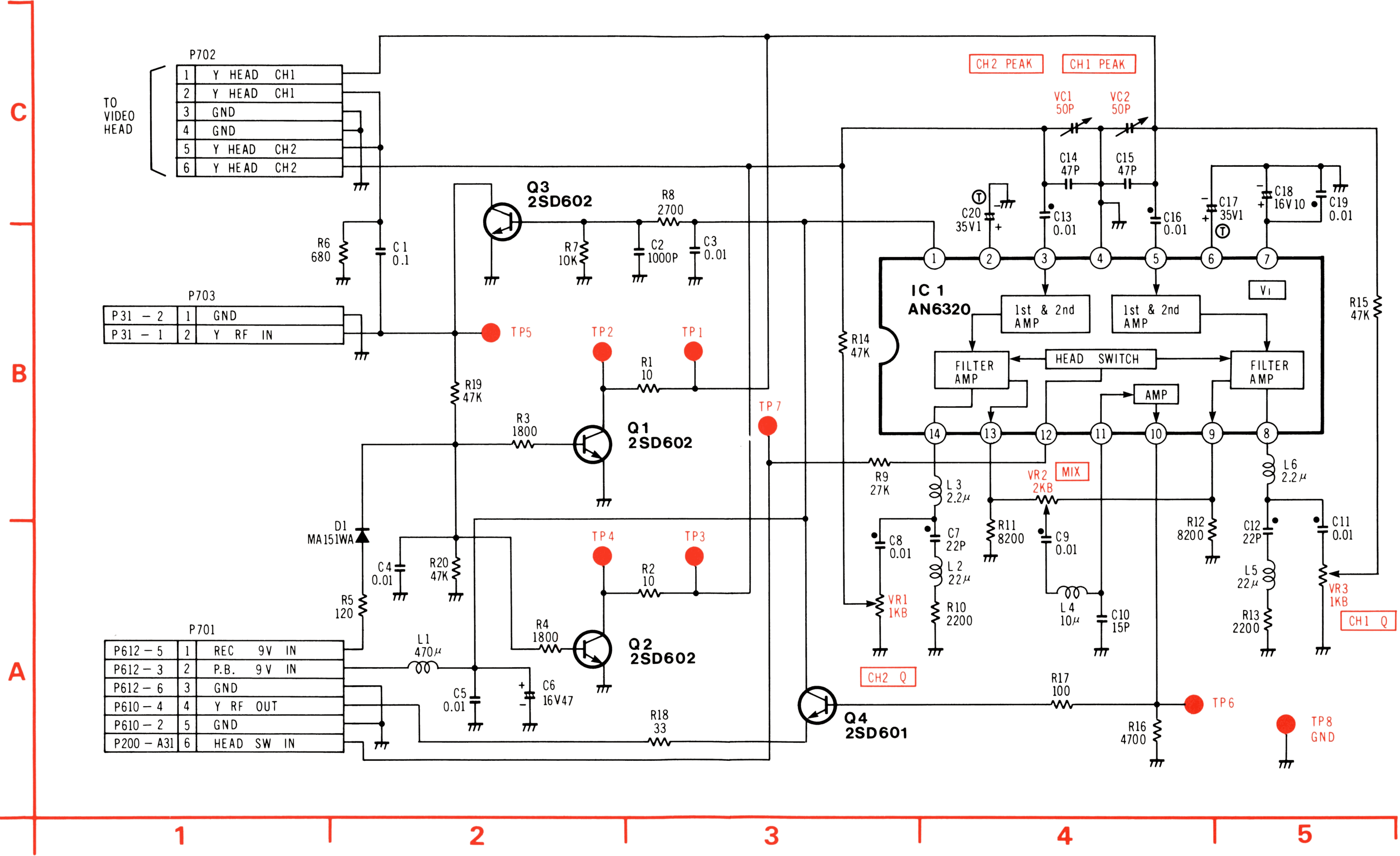


Figure 10-3. Head Amp Schematic Diagram

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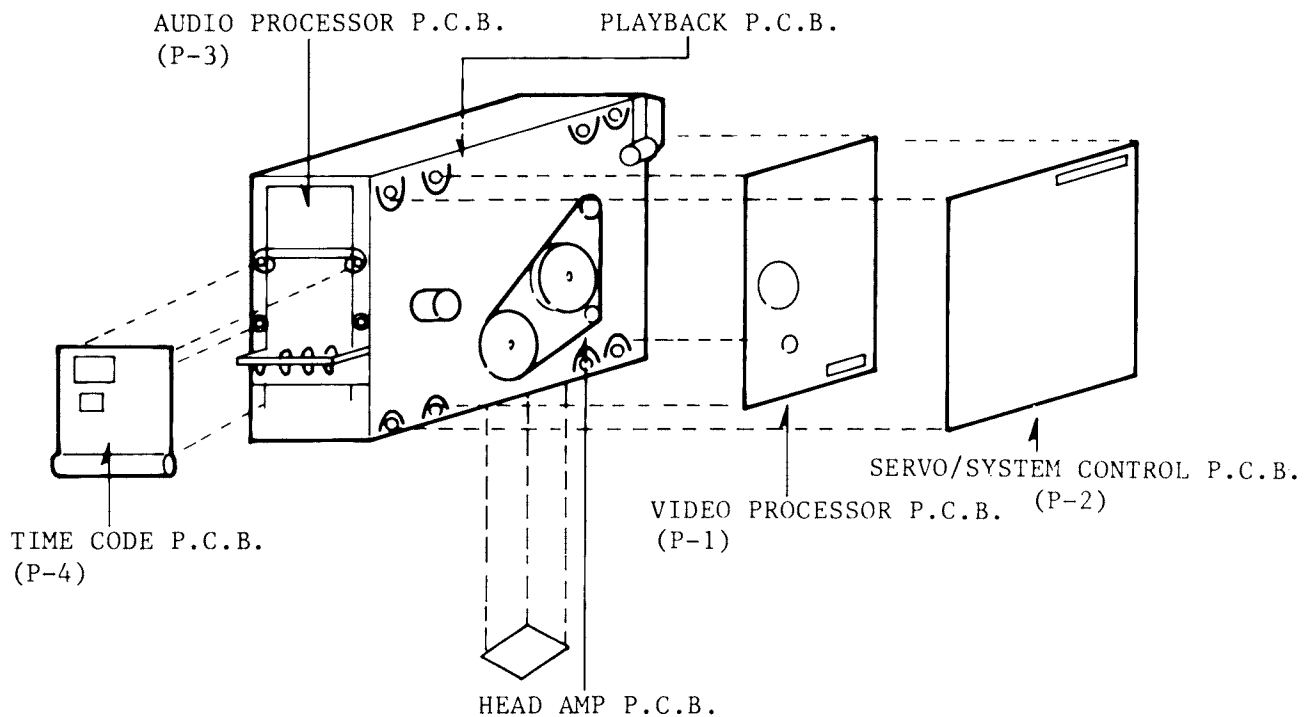


M-VISION™

Playback Circuit

- *Electrical Parts List*
- *Block Diagram*
- *Printed Circuit Board*
- *Schematic Diagram*

Playback C.B.A. (VEP03190A)



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Parts List

Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks	Ref. No.	Part No.	Part Name & Description	Pcs / Set	Remarks
	VEP03190A	PLAY BACK P.C. BOARD							
							Capacitors		
		Integrated Circuit			C1	ECEA1CSS101	Electrolytic 16V 100	1	
IC1	AN6328		1		C2-4	ECUV1H103KBM	Ceramic 50V 0.01	3	
					C5	ECEA0JSS471	Electrolytic 6.3V 470	1	
					C6	ECUV1H103KBM	Ceramic 50V 0.01	1	
		Transistors			C7	ECEA0JK330	Electrolytic 6.3V 33	1	
Q1	2SD601		1		C8	ECUV1H103KBM	Ceramic 50V 0.01	1	
Q2	2SB835		1		C9	ECEA0JK330	Electrolytic 6.3V 33	1	
Q3	2SC1328		1		C10	VCM0008	Semiconductor	1	
Q4	2SB873		1		C11	ECUV1H103KBM	Ceramic 50V 0.01	1	
Q5	2SD601		1		C12	ECUV1H120JCM	Ceramic 50V 12P	1	
Q6	2SB709		1		C13	ECUV1H103KBM	Ceramic 50V 0.01	1	
Q7	2SC2295		1		C14	ECUV1H270JCM	Ceramic 50V 27P	1	
Q8	2SB709		1		C15	ECEA0JK330	Electrolytic 6.3V 33	1	
Q9-11	2SC2295		3		C17	ECEA0JK470	Electrolytic 6.3V 47	1	
Q12	2SA684		1		C18	ECUV1H120JCM	Ceramic 50V 12P	1	
					C19	VCM0009	Semiconductor	1	
					C20	ECEA0JK101	Electrolytic 6.3V 100	1	
					C21	VCM0010	Semiconductor	1	
		Diodes			C22	ECUV1H120JCM	Ceramic 50V 12P	1	
D1	MA151A	Chip	1		C23	ECUV1H103KBM	Ceramic 50V 0.01	1	
D2	RD5.6EB	Zener	1		C24	ECEA1CSS101	Electrolytic 16V 100	1	
D3-5	1SS16		3		C25	ECEA0JSS471	Electrolytic 6.3V 470	1	
					C26	ECUV1H121JCM	Ceramic 50V 120P	1	
		Resistors					Coils		
R1,2	ERJ8GCJ563	56K	2		L1,2	VLQEL06F221K	220uH	2	
R3,4	ERJ8GCJ153	15K	2		L3	VLQEL06F150J	15uH	1	
R5,6	ERJ8GCJ103	10K	2		L4	VLQEL06F560J	56uH	1	
R7,8	ERJ8GCJ222	2.2K	2		L5	VLQEL06F221K	220uH	1	
R9	ERJ8GCJ103	10K	1						
R10	ERJ8GCJ102	1K	1						
R11	ERJ8GCG911	910	1						
R12	ERJ8GCG202	2K	1				Filter		
R13,14	ERJ8GCJ102	1K	2		FL1	VLP0171		1	
R15	ERJ8GCJ333	33K	1						
R16	ERJ8GCJ101	100	1						
R17	ERJ8GCJ152	1.5K	1						
R18	ERJ8GCJ102	1K	1				Connectors		
R19	ERJ8GCJ122	1.2K	1		P610	VJP1229		1	
R20	ERJ8GCJ392	2.9K	1			VJB03190		1	
R21	ERJ8GCJ223	22K	1		P611	VJP1231		1	
R22	ERJ8GCJ392	3.9K	1		P612	VJP1233		1	
R23	ERJ8GCJ102	1K	1						
R24,25	ERJ8GCJ331	330	2						
R26	ERJ8GCJ102	1K	2						
R27	ERJ8GCJ331	330	1				Miscellaneous		
R28	ERJ8GCJ560	56	1		TP1-5	VJH0183	Test Pin	5	
R29	ERJ8GCG682	6.8K	1						
R30	ERJ8GCG123	12K	1						
R31,32	ERJ8GCJ100	10	2						
R33	ERJ8GCJ101	100	1						
R34	ERJ8GCJ332	3.3K	1						
R35	ERJ8GCG390	39	1						
R36	ERJ8GCG201	200	1						
R37	ERJ8GCG152	1.5K	1						
R38	ERJ8GCG222	2.2K	1						
R39	ERJ8GCG182	1.8K	1						
R40	ERJ8GCJ681	680	1						
R41	ERJ8GCG223	22K	1						
R42	ERJ8GCJ391	390	1						
R43	ERD25TJ331	1/4W 330	1						
R44	ERJ8GCJ750	75	1						
		Variable Resistor							
VR1	EVM38GA00B53	5K	1						

PLAYBACK BOARD BLOCK DIAGRAM

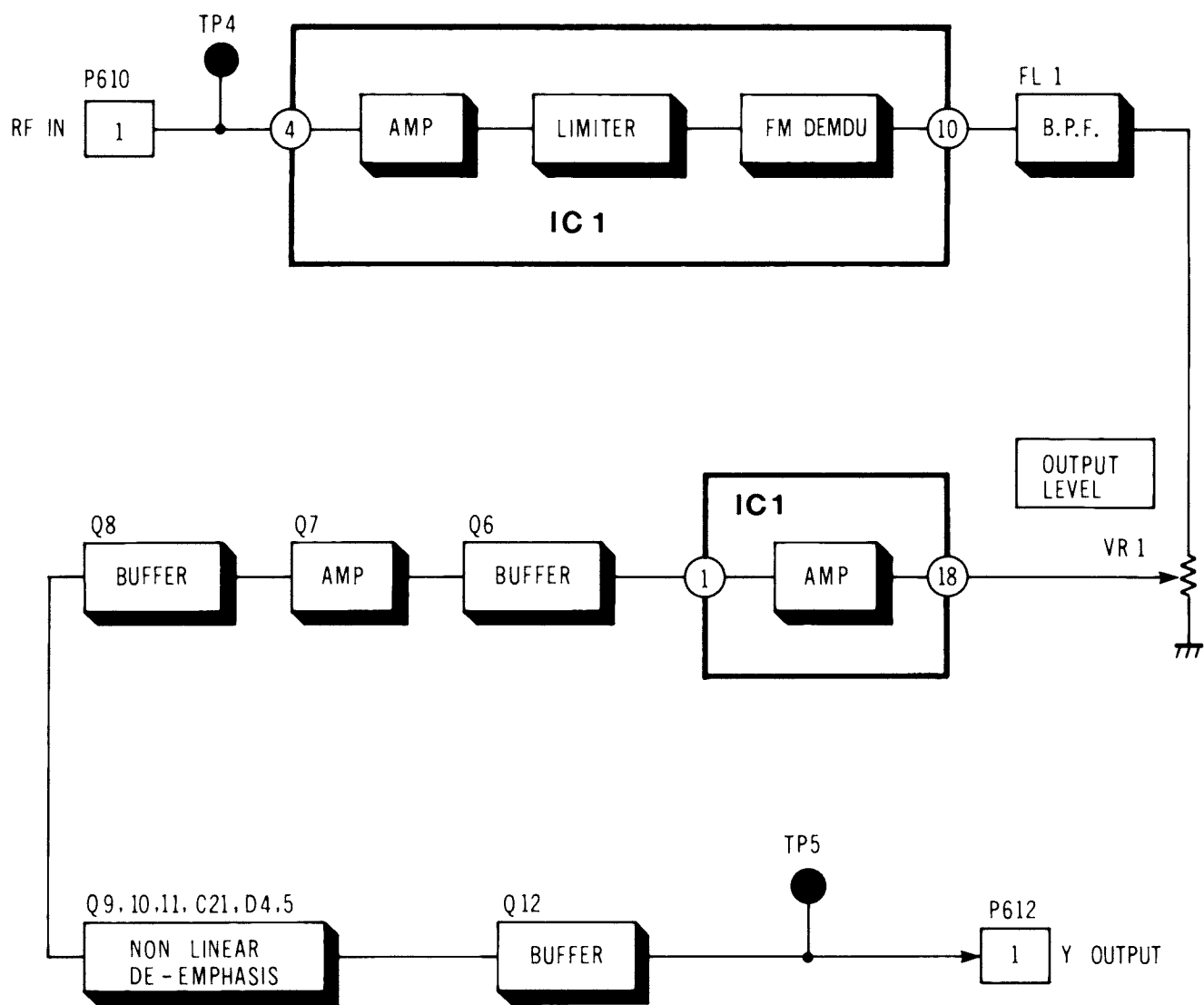


Figure 11-1. Playback Board Block Diagram

PLAYBACK BOARD P.C. BOARD (VEP03190A)

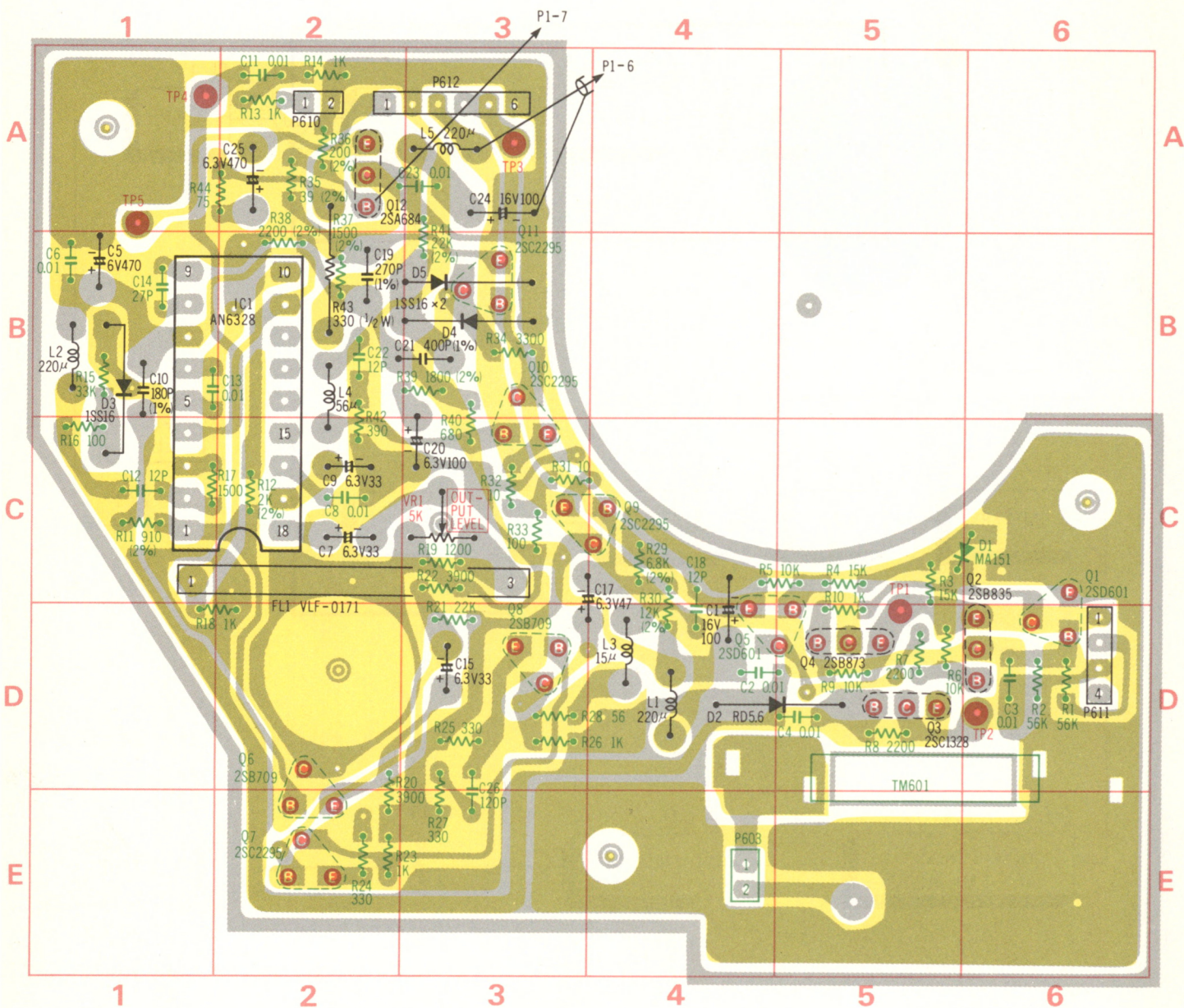


Figure 11-2. Playback Board P.C.Board

PLAYBACK BOARD SCHEMATIC DIAGRAM

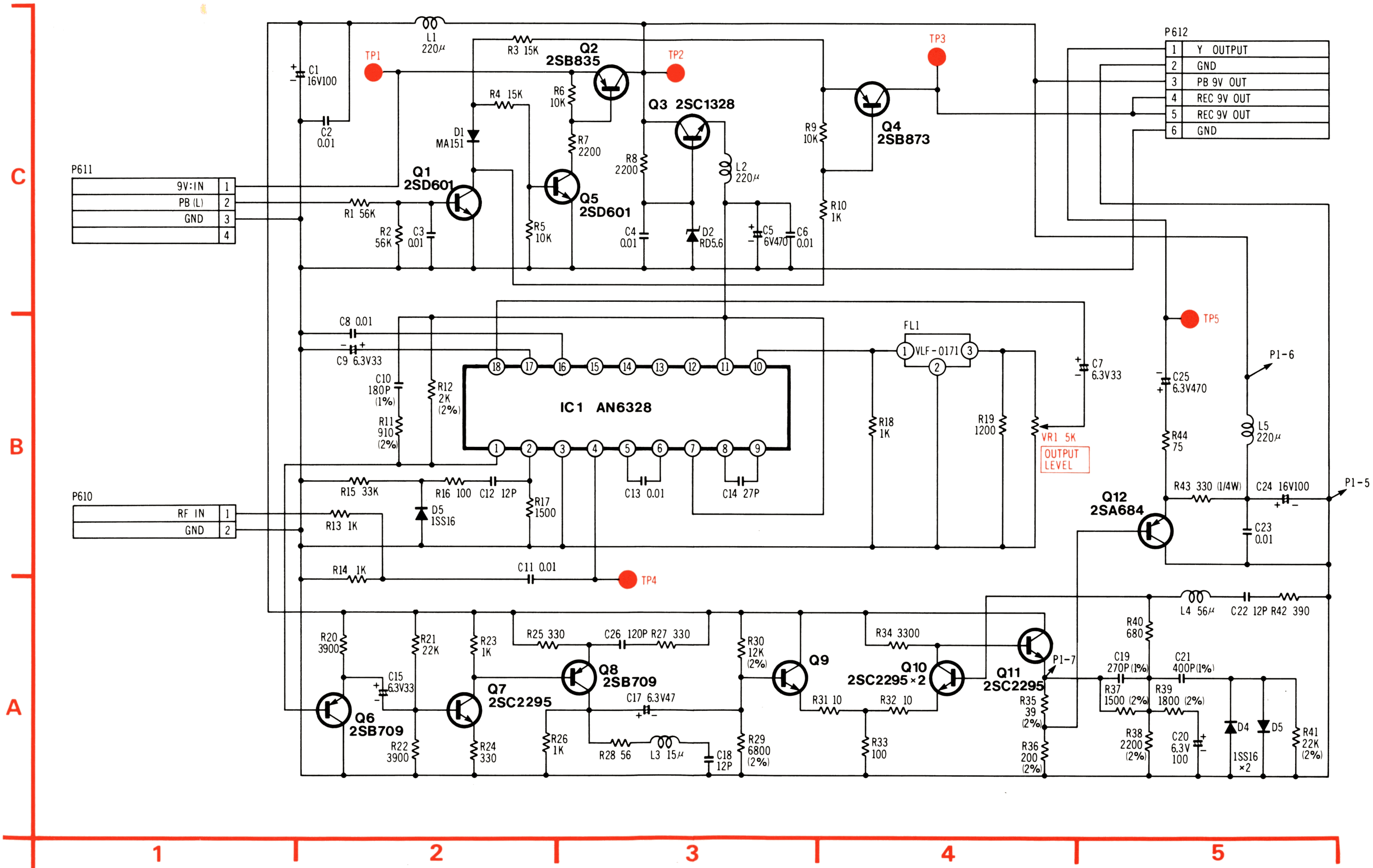


Figure 11-3. Playback Board Schematic Diagram

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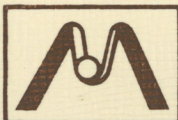
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